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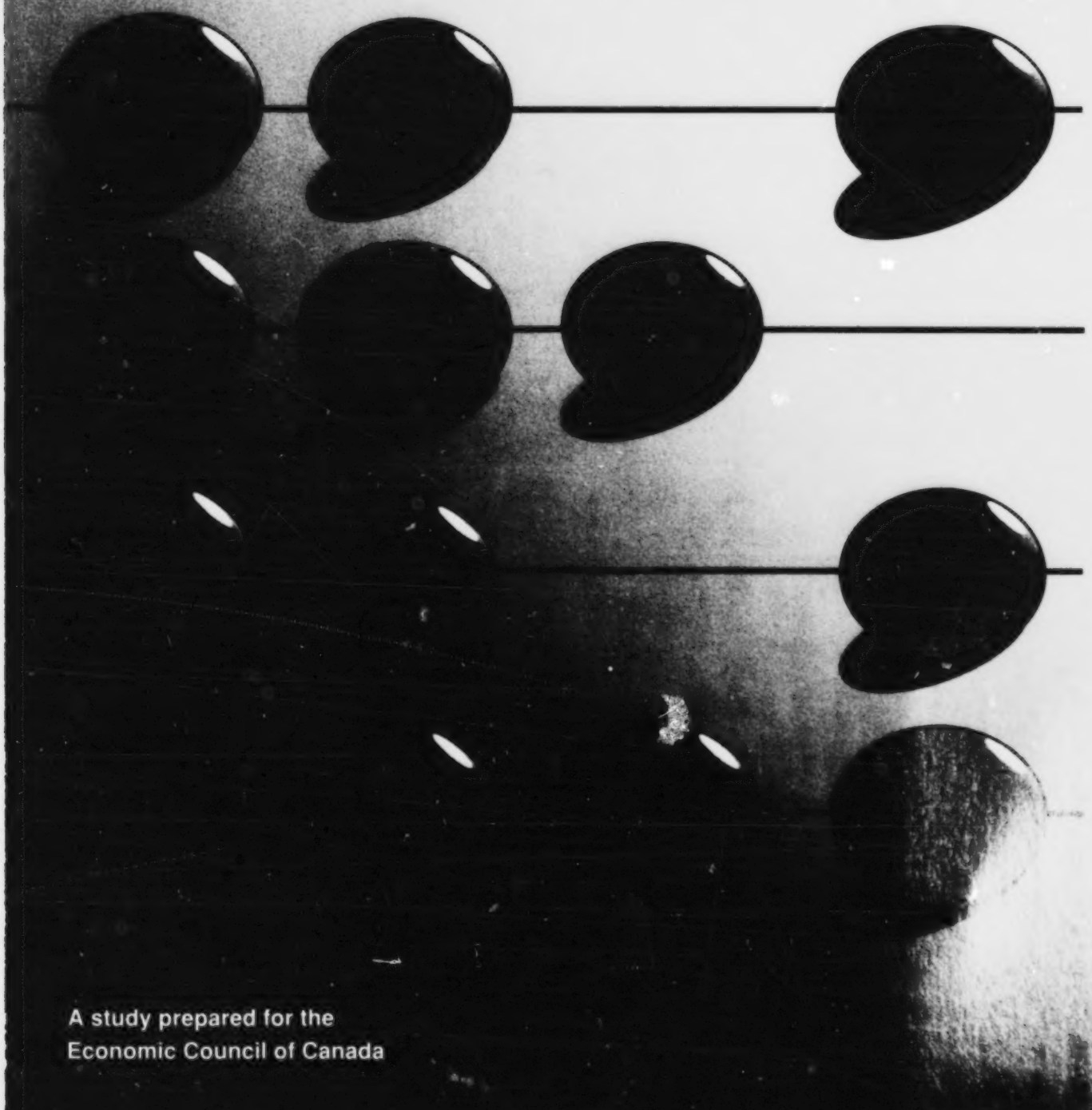
CREATING JOBS IN THE PRIVATE SECTOR

Evidence from the Canadian Employment Tax Credit Program

Surendra Gera



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Creating Jobs in the Private Sector

SURENDRA GERA

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Evidence from the Canadian Employment Tax Credit Program

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Contents

Acknowledgments		vii
Foreword		ix
1	**Introduction**	1
	Direct Job Creation Programs in Canada	1
	The Focus of the Study	3
	Objectives of the Study	4
	Organization of the Study	4
2	**Wage Subsidy Schemes: Nature, Rationale, and Review of Experiences**	5
	The Nature of Wage Subsidies	5
	A Review of Experiences	5
	Economic Rationale for Wage Subsidies	9
	Evaluating the Impact of Wage Subsidies	11
3	**The Employment Tax Credit Program**	13
	Period of Validity, Form, and Amount of Subsidy	13
	Conditions for Obtaining a Subsidy	13
	Methods of Operation	13
	Program Modifications	14
	Descriptive Statistics	14
	Characteristics of Program Participants	16
	Employers	16
	Employees	18
4	**The Efficiency Basis of the Employment Tax Credit Program**	21
	The Social Opportunity Cost of Labour	21
	A Framework for Analysis	24
	The Basic Model	24
	The Social Opportunity Cost of a Job in the Presence of Taxes and UI Benefits	25
	Estimating the Social Opportunity Cost of a Job Created by the ETCP	26
	Estimating the Probability of Finding Alternative Employment (Π)	27
	Estimating the Proportion of Time a Person Expects to Receive UI Benefits while Unemployed (d)	29
	Estimating the Value of Nonmarket or Leisure Time while Unemployed in the Presence of the Cost of Acquiring Skills	30
	The Weekly Wage Rate in the Temporary Sector ($\overline{W}_2$)	30
	The Cost of Acquiring Skills (C)	30

The Weekly Wage Rate in the Permanent Sector (W_1) 31
Tax Parameters, t_1 and t_2 32
The Unemployment Insurance Benefit Rate (b) 32
Specification of Other Variables Required to Estimate the SOCJ 32
Estimating the Social Opportunity Cost of an ETCP Job 35
Conclusion 37

5 The Net Employment Impact and the Cost Effectiveness of the ETCP 41
A Framework for Measuring the Net Employment Effect of the ETCP 41
Estimating the Displacement Effects of the ETCP 42
Estimating the Deadweight Impact of the ETCP 43
The Net Employment Effect of the ETCP 44
The Budgetary Cost per Net Work-Year Created by the ETCP 44
Main Findings 47

6 The Postprogram Labour Market Performance of the ETCP Participants 49
Some Descriptive Statistics 49
Evaluation Issues 49
Selection of the Control Group 50
Determinants of the Change in the Probability of Employment 50
The Postprogram Length of Employment (per Spell) of Participants 53
The Postprogram Increase in Weekly Wages of Participants 53
Main Findings 55

7 Conclusions 57
A Bottom Line? 57
General Lessons for Future Programs 59

Appendix A 63

Appendix B 69

Appendix C 75

Notes 79

List of Tables and Charts 83

Bibliography 85

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Of course, I am solely responsible for any errors or omissions.

Foreword

Over the past decade, direct job creation programs have grown dramatically throughout the western industrialized world. In Canada, the federal government has substantially increased support for such programs, which are designed to provide jobs for both the structurally and cyclically unemployed. Outlays averaged about $500 million per year during the 1977-85 period. Most of these expenditures were for public-service employment, with more modest efforts undertaken to subsidize job creation in the private sector.

Despite the growth of job creation programs, analytic information has been lacking on such basic issues as: How many net jobs can they create, and at what cost? How effective are these programs in increasing employment for workers with structural employment problems? How do they fare according to the criterion of economic efficiency? To what extent do the programs improve the longer-term employment prospects of program participants?

In order to examine these issues and their policy implications, Dr. Surendra Gera, a senior economist on the staff of the Economic Council of Canada, has analysed the 1978-81 Canadian Employment Tax Credit Program (ETCP). The program was a temporary wage subsidy scheme offering tax credits of up to $2.00 an hour to stimulate incremental employment in all Canadian regions.

The main objectives of the study are to evaluate the efficiency of the ETCP in terms of social benefits and social costs; to measure the incremental employment effect of the program; to calculate the cost, from the policy maker's perspective, of creating an incremental work-year of employment; and to determine whether the future employability of participants improved. The study uses a data base provided by Employment and Immigration Canada that contains information on the program participants' pre- and post-program employment and unemployment experiences. The results of the study suggest that, on balance, wage subsidies along the lines of the ETCP should be viewed as a promising policy approach.

Since job creation appears likely to remain an important policy issue in Canada for some time to come, this study will be useful for those involved in the development and evaluation of government programs in this area. The findings should, for example, encourage the use of private-sector employment subsidies to create employment opportunities for youth, low-skilled adults, and long-term unemployed individuals.

Judith Maxwell
Chairman

1 Introduction

During most of the 1960s, public policy throughout the western industrialized world relied mainly on general expansionary monetary and fiscal measures to solve labour market problems. In the late 1960s and early 1970s, however, faced simultaneously with soaring unemployment and double-digit inflation, governments became disenchanted with traditional demand-management policies and began resorting increasingly to a variety of "new" employment measures. One of these was direct job creation – i.e., measures to stimulate employment without prior stimulation of the demand for goods and services. Direct job creation can take many forms. The two dominant types are public-service employment programs and wage (or employment) subsidies to the private sector.

It is argued that direct job creation policies can contribute to the reduction of cyclical and structural unemployment without compounding inflation. Such measures operate on the demand side of the labour market and thus can promote employment during the recovery of the economy. These policies can also serve a structural objective if they are designed to alter the mix of employment in favour of individuals who experience exceptionally high rates of unemployment and/or of regions that are hit by above-average structural unemployment. By targeting such policies at workers who have less bargaining power on wages than more advantaged workers or at sectors with low upward wage responsiveness, increased employment can be achieved with lower inflationary pressures.

Direct job creation measures have been many and varied. Their common aim is to stimulate employment in an effort to reduce unemployment rates. It is argued that it is less costly to stimulate employment by such measures than by income tax cuts, for example (OECD, 1983); that direct job creation generates more employment and reduces unemployment to a greater extent than do tax cuts because so much of any income increase associated with the latter leaks overseas or into private savings; that by targeting groups with a relatively low inflationary impact, job creation programs may be less inflationary; and that job creation has a smaller impact on budget deficits because of the greater flowback to the public purse from lower unemployment benefits and increased tax revenues.

The case for direct job creation can also be viewed from a microeconomic standpoint. In a complex labour market, there may exist factors that constrain purely economic forces and lead to distorted resource allocation and less economic efficiency. Factors like minimum wages, payroll taxes, and unemployment insurance benefits (which are in place for very good reasons of their own) have often been viewed as driving a wedge between the social opportunity cost of labour (that is, the value of the alternative output forgone) and market wages. The effect of this distortion is to give the employer a different and higher view of the marginal cost of labour than that which society as a whole holds. It is precisely the reduction of this gap that may be accomplished by direct job creation programs. The argument for such programs is therefore one of efficiency: by reducing the cost of hiring labour to potential public or private employers and narrowing the gap between the true and perceived marginal cost of labour, a distortion is corrected. The equity objective is also served as the position of the target groups is improved.

Direct Job Creation Programs in Canada

In Canada, direct job creation programs have been viewed as a tool of manpower policy to increase employment, particularly for low-wage workers, since the early 1970s. The federal government, motivated by both countercyclical and structural unemployment concerns, has substantially increased support for such programs. Outlays rose from about $170 million in fiscal year 1975/76 to an annual average of about $500 million during the period 1977-85 (Table 1-1). Although most of these expenditures were for public-service employment (PSE) programs, the emphasis has certainly changed in recent years.

PSE programs in Canada have generally been designed to accomplish one or more of the following objectives: 1) to increase total employment in general and to provide jobs for particular groups of individuals such as youths, natives, the handicapped, and those with little education or few skills, who face the greatest difficulties in obtaining regular jobs; 2) to improve the earnings or "future employability" of individuals who participate by developing their marketable skills; and 3) to produce a more equitable income distribution. Based on these principles, the Local Initiatives Program (LIP) and Opportunities for Youth (OFY) were intro-

Table 1-1

Direct Job Creation Programs, Number of Participants and Expenditures, Canada, 1977-85

	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84[1]	1984/85[1]
					(Thousands)			
Direct job creation programs:[2]								
Participants	113.4	99.6	128.4	131.9	78.6	215.1	296.2	225.2
					(Millions of $)			
Expenditures	410.6	276.4	281.3	256.1	277.9	608.8	952.3	943.2

1 The figures for 1983/84 and 1984/85 exclude summer jobs and expenditures.
2 The Employment Tax Credit Program was in effect from 1978/79 to 1980/81. Since it was not an expenditure program as such, it is not included in the expenditures, but its participants are included in the total.
Source Economic Council of Canada (1983); and Employment and Immigration Canada, *Annual Report*, various years.

duced in 1971, and the Local Employment Assistance Program (LEAP) was established in 1973. Other schemes followed, such as the Canada Works and the Local Economic Development Assistance (LEDA) programs.

In April 1983, the federal government announced the consolidation of 12 job creation programs into four major programs: Canada Works, which included earlier initiatives such as the New Employment Expansion and Development (NEED) program and the Unemployment Insurance/Job Creation program; the Jobs Corps program, designed to assist disadvantaged workers in developing the skills and work habits that they need to become productive members of the regular labour force; the Local Employment Assistance and Development (LEAD) program, aimed at supporting long-term, community-based planning and employment development in slow-growth regions and in communities where chronic high unemployment persists; and the Career-Access Program for Stimulating Employment in the private sector.[1] In April 1986, the federal government replaced these programs by the Canadian Job Strategy (CJS), the details of which are provided below.

The Canadian Job Strategy

Here is a brief description of the six components of the CJS:

Job Development ($395 million). The target group for this program is the long-term unemployed (24 out of the past 30 weeks without work). The earlier job creation programs – for the most part with training features added – are now under this component.

Job Entry ($230 million). There are three options here: youths (under 25) in transition from school to work; women who have been out of the labour force for three years or more and are re-entering it; and summer-student work programs.

Community Futures ($93 million). A "hodge-podge" of programs, primarily focusing on adjustment to structural change – for example, the Canadian Industrial Renewal Program. This component is triggered by the designation of a community as eligible due to hard times because of industrial restructuring.

Skill Investment ($57 million). A program aimed at training the already employed.

Skill Shortages ($50 million). This program basically extends the Critical Trades Skill Training initiative under the National Training Program.

Innovations ($91 million). This component is designed to develop new ways of training.

Source Employment and Immigration Canada (1984).

The Canadian Job Strategy operationalized the philosophy articulated in the Training Consultation Paper released by the Minister of Employment in December 1984. The CJS has six component programs, with a total budget of $1.5 billion in 1986/87. While, at first blush, this global figure would seem to suggest a heightened federal commitment to training, in fact it includes programs previously categorized as job creation, mobility, and structural adjustment. The CJS makes no conceptual distinction among different types of programs – they all fall under the training umbrella. The major emphasis of the CJS initiative is on training. The overall level of funding on employment programs is low. The new training strategy retains a focus on labour market demand, but it is heavily influenced by two new themes: fewer federal dollars and, related to this, more vigorous supply-side targeting. The targets of the CJS are substantial long-term unemployment, special problems for young people and women, and hard-hit communities.

At the federal level, initiatives for the private sector included the Job Experience Training Program, which operated from 1977 to 1979 and was designed to offer summer jobs to young people who found it difficult to integrate into the work force. The Employment Tax Credit Program, begun in 1978, was a temporary wage subsidy scheme offering tax credits of up to $2.00 an hour to stimulate "incremental" employment in the private sector in all Canadian regions. The program remained in effect until March 1981. The New Technology Employment Program, a targeted wage subsidy scheme, was launched in September 1980 to create jobs for highly educated graduates in scientific and technical fields who are unable to find employment in their disciplines. Other wage subsidy schemes followed, such as the Portable Wage Subsidy and the Program for the Employment-Disadvantaged; these were consolidated into the Career-Access program in September 1983.

The Focus of the Study

This study focuses on wage subsidies for job creation in the private sector.[2] Wage subsidies were chosen for intensive analysis for a number of reasons. First, while PSE programs were the centrepiece of direct job creation policy during the 1970s, both here and abroad, there has been a growing interest in the use of wage subsidies in recent years. Second, most economic assessments of employment programs to date have focused upon public-service employment, and information has been lacking on many important policy issues with respect to subsidizing private-sector job creation. Third, there appears to be a growing consensus regarding the limitations of PSE programs (Tannenwald, 1982, p. 25). They have often created superfluous, short-duration, "dead-end" jobs providing little useful skill training, which often simply led participants back to the unemployment queue. Furthermore, the net impact of PSE programs on employment has been minimal because the availability of these funds has induced local governments to reduce their own fiscal expenditure for hiring.

By contrast, wage subsidies, it is argued, create jobs in the private sector where employers already have a known production process and a set marketing channel for the goods and services they produce (Haveman and Christiansen, 1978; Jenness, 1984). The discipline of the market leads employers to train their workers in useful skills and create jobs directly in regular employment, so that workers are not making a transition from special temporary programs. Furthermore, wage subsidies can be designed so as to limit the value of windfalls to employers. Finally, governments in both Canada and the United States are pursuing economic policies that place far greater emphasis on the overall expansion of private-sector job opportunities.

Despite the growing use of wage subsidies to create jobs over the past few years, their efficacy is a matter of considerable dispute, primarily because little has been undertaken in the way of quantitative evaluations. A number of questions need to be answered:

First, do employment subsidies meet a strict economic efficiency test in terms of social benefits and social costs? Such programs lead to an increase in economic welfare of the community if the social benefits exceed the social costs. The major item on the benefit side is the value of output produced by the workers directly employed through the program. On the cost side, the key element is the social opportunity cost of program participants, i.e., the value of what the workers employed would have been doing if the program had not existed. The social opportunity cost of labour represents the value of a composite package (gross wages, unemployment insurance payments, the value of leisure or nonmarket time, and so on) that is given up when a worker accepts a new position.

Second, what is the net or incremental employment impact of wage subsidy programs? There are certain undesirable side effects associated with wage subsidies. Employers can raise the amount of subsidy received by accelerating labour turnover. By simultaneously hiring subsidized workers and firing unsubsidized workers, employers can collect subsidies without there being any increase in total employment. This problem is known as "churning" (OECD, 1982, p. 11). This can be minimized by marginal-employment subsidies that are based on an increase in the stock of employment rather than on the flow. Furthermore, some deadweight is inevitable. Deadweight reflects the fact that some of the subsidy goes to firms that would have

increased their employment even without the subsidy and represents a windfall to those firms. Finally, some displacement may occur, whereby employment associated with the subsidy in one firm displaces jobs elsewhere.

Finally, to what extent do employment subsidy programs have a positive effect on the future employability of participants? One possible component of social benefit is the increased productivity of the participants in the program. That is, the program participants may be able to provide increased future output because the work experience or on-the-job training acquired within the program increases their productivity.

Objectives of the Study

This study attempts to conduct a comprehensive empirical evaluation of the 1978-81 Canadian Employment Tax Credit Program (ETCP) with three objectives in mind. The first is to evaluate the efficiency of the program in terms of the social benefits and social costs it generated. The net gain from the ETCP is calculated as the value of the output of labour in the new activity, less the value of the alternatives that workers forgo in accepting new employment. Thus the first set of principal questions posed in the study are: What is the social opportunity cost of a job created by the ETCP in various regions, and is it higher or lower than the value of the output produced by the job? In other words, was the job creation brought about by the ETCP socially efficient?

The second question posed is: What is the net or incremental employment effect of the ETCP? This is defined as the employment level in the economy with the program, less that without it. To evaluate the cost effectiveness of the ETCP, it is important, from a policy maker's point of view, to be able to determine what proportion of the apparent increase in employment would have existed even in the absence of the subsidy.

Finally, an important potential by-product of the ETCP was an improvement in the longer-term employment prospects of program participants. In this regard, we have analysed the labour market impact of the ETCP on those individuals who participated in the program in order to determine whether they received some on-the-job training and, hence, whether they enjoyed long-run benefits such as increased employability, increased length of subsequent employment per spell, and increased weekly wages at future job(s).

Organization of the Study

This study is comprised of seven chapters. Chapter 2 presents a discussion of wage subsidies in general and a brief review of temporary wage subsidies implemented in major industrialized countries since the early 1970s. It also provides the economic rationale underlying these measures.

Chapter 3 discusses the main provisions of the Canadian Employment Tax Credit Program. A brief description of the firms and workers hired under the program is also provided.

Chapter 4 examines the empirical efficiency basis of the ETCP and explores whether there is a case for differential subsidization of workers between high- and low-unemployment regions. The methodology and the results of the estimation of the social opportunity cost of a job created through the ETCP are also discussed in this chapter.

In Chapter 5, we look at the net employment effect of the program and evaluate its cost effectiveness. The chapter presents both the methodology and results of the analysis.

Chapter 6 looks at the postprogram performance of the people involved in the program to determine whether it succeeded in improving their skills and in providing long-run benefits such as increased employability and increased weekly wages at future job(s).

Finally, Chapter 7 summarizes the study and draws further policy conclusions. In particular, we draw lessons regarding program structure and effectiveness from the experience with employment subsidies in Canada and other western industrialized countries.

2 Wage Subsidy Schemes: Nature, Rationale, and Review of Experiences

In recent years, virtually all the major industrial countries have used wage subsidies in one form or another to combat unemployment.[1] The employment subsidy schemes implemented so far have usually been aimed at reducing cyclical unemployment and are thus intended to be temporary. But the problems they are designed to counter sometimes persist for long periods; frequent renewals of existing schemes, with important modifications, are therefore common. After a brief discussion of the nature of wage subsidies, we shall present selective examples of wage subsidy programs implemented in selected industrial countries.

The Nature of Wage Subsidies

Wage subsidies may be paid either to employers or directly to workers. Employer-based subsidies are intended to stimulate the demand for labour (especially for low-skilled labour) by subsidizing wage costs to employers. Worker-based wage subsidies to increase employment operate through supply-side changes in the labour market. By raising the amount of labour supplied at presubsidy market wages, a worker subsidy can lower the market wages paid by employers and thus raise employment (Lerman, 1982). With the exception of the earned income-tax credit, the only subsidy paid to workers in the United States, governments in most countries have attempted to stimulate employment through wage subsidies paid to employers.

Employer-based wage subsidies have appeared in various guises. Most commonly, they are one of the following three variations:

Marginal-Employment Subsidy — A subsidy that is provided to employers to offset a portion of their wage payments to workers and that is paid only on increments to the employment level in a firm. Such a subsidy favours expanding firms rather than weak and declining ones.

Recruitment Subsidy — This subsidy is provided to employers for each new worker hired. Unlike the marginal-employment subsidy, the recruitment subsidy does not require the firm to increase the stock of employment above a stipulated level. A potentially serious flaw of this subsidy measure is known as the "churning effect," which occurs when employers raise the amount of subsidy received by accelerating labour turnover within the firm and collecting the subsidy for each new worker hired.

Redundancy-Averting Subsidy — The purpose of this subsidy is to avert or at least defer layoffs by subsidizing workers who are at risk of being made redundant. This subsidy is introduced as a countercyclical measure and is generally concentrated on declining industries that face severe pressures from international competition. A danger implicit in this subsidy is the risk of propping up structurally weak firms.

Each of these subsidies may be *categorical*, if they are targeted at employers or employees with particular industrial, regional, demographic, or other characteristics (age, sex, region, unemployment duration, or skills, for example), or *general*, if they are applied regardless of such characteristics. In addition, the subsidy may be a flat amount or may vary with the level of earnings, the wage rate, the overall wage bill, or the duration of coverage. The subsidy can be paid to the employer either directly or through a tax credit (OECD, 1982; Haveman and Christiansen, 1978).

A Review of Experiences

Several of these variants have been implemented in recent years, as *Canada* has used a number of wage subsidy measures to induce job creation in the private sector (see Table 2-1). The Job Experience Training (JET) program was introduced in 1977 as a temporary wage subsidy scheme to create jobs in the private sector, offering 50 per cent of hourly wages up to $1.50, up to a maximum of $1,560 per worker. The program was targeted at those under 25 who were registered as unemployed for at least three months and had few prospects of finding regular employment. The jobs created through this program were to be incremental and to last at least 26 weeks, and program participants were to be considered for permanent employment at the end of the subsidy period. The program remained in effect until 1979.

The Employment Tax Credit Program (ETCP), a marginal-employment subsidy scheme, was initiated in 1978 to

Table 2-1

Wage Subsidy Programs in Canada,[1] 1977-85

	Fiscal year	Expenditures	Jobs created and/or number of participants
		(Millions of $)	
Job Experience Training	1977/78	18.0	20,588 jobs
(October 1977 – March 1979)	1978/79	45.0	39,185 jobs
Employment Tax Credit Program	1978/79	..	17,337 jobs
(April 1978 – March 1981)	1979/80	..	48,427 jobs
	1980/81	..	47,418 jobs
New Technology Employment Program	1980/81	2.2	
(September 1980 – March 1983)	1981/82	6.4	820 participants[2]
	1982/83	3.5	1,358 participants
Portable Wage Subsidy[3]	1981/82	7.0	1,743 vouchers issued
(March 1981 – September 1983)	1982/83	3.1	1,721 vouchers issued
	1983/84[4]	1.3	316 vouchers issued
Program for the Employment-Disadvantaged	1981/82	10.9	7,102 participants
(May 1981 – March 1984)	1982/83	34.9	21,657 participants
	1983/84[5]	1.1	431 participants
Career-Access	1983/84[6]	93.6	44,100 participants
(September 1983 – August/September 1985)			20,300 person-year equivalent
	1984/85[6]	209.1	58,400 participants

1 Excludes the Canada Manpower Industrial Training Program, introduced in 1974, which was designed as a recruitment and redundancy-averting subsidy to provide on-the-job training.
2 Cumulative since the program started in September 1980.
3 Incorporated into the Career-Access program effective September 1983.
4 The figures represent only the Industrial and Labour Adjustment Program (ILAP) component.
5 The figures represent the program statistics for designated communities as they relate to the ILAP.
6 These figures exclude Summer Career-Access.
Source Employment and Immigration Canada, *Annual Report*, various years.

stimulate employment in the private sector. A detailed discussion of this program is provided in Chapter 3.

The New Technology Employment Program (NTEP), a targeted wage subsidy scheme, was launched in September 1980. It was designed to create jobs for highly educated graduates in scientific and technical fields who were unable to find employment in their disciplines. The program assisted small-scale organizations through wage subsidies for new jobs in research and development and for R & D applications in a number of priority areas. The program supported activities in the development and application of technological innovations in manufacturing, product and process development, and the development and application of small-scale energy conservation programs and alternate energy technologies. A federal contribution of up to 75 per cent of the wages of each eligible employee was paid to a maximum contribution of $290 a week per job, for a maximum of 12 months. The maximum reimbursement to an employer was $150,000 (EIC, *Annual Report, 1980-81*, p. 10).

The Portable Wage Subsidy (PWS) program, a general targeted wage subsidy scheme that was part of a new labour-adjustment program, was introduced in March 1981 to help displaced workers 45 years old or over find alternative employment. To be eligible for the program, workers were required to have worked at least two years for a firm within an industry and community designated under the Industrial and Labour Adjustment Program (ILAP) or for a firm covered by a Manpower Consultative Service (MCS) agreement. The subsidy was granted at the rate of $2.00 per participant per hour, for up to 40 hours per week and a period of up to 12 months. Eligible participants were given PWS vouchers, which they presented to a prospective employer. If the employer hired the participant, he would present the voucher to the federal government for reimbursement (EIC, *Annual Report, 1981-82*, p. 27).

The Program for the Employment-Disadvantaged (PED) – a major initiative in the field of wage subsidies in the private sector designed to develop the human resource potential of employment-disadvantaged Canadians – was launched on May 1, 1981. The purpose of the program was to encourage private-sector employers to hire, and maintain in employment, physically and mentally handicapped persons and other unemployed persons who had experienced serious difficulties in securing and keeping employment. It provided a subsidy equal to 85 per cent of gross wages initially, thereafter decreasing progressively to 50 and 25 per cent, for a total subsidy period of 65 weeks for handicapped workers, and of 39 weeks for other employment-disadvantaged persons. In addition, up to $5,000 was to be reimbursed to employers hiring handicapped persons under the program to assist in defraying costs related to the restructuring of the workplace or to the purchase of special equipment in order to facilitate the employment of handicapped persons (EIC, *Annual Report, 1981-82*, p. 27).

Finally, under the consolidated job creation process of 1983, Career-Access, a targeted wage subsidy program designed to provide employment opportunities for the inexperienced, the disabled, and others facing barriers to employment, was launched on September 13, 1983. Career-Access absorbed a number of earlier programs, such as the New Technology Employment Program, the Portable Wage Subsidy program, the Canada Community Services Projects (CCSPs), and the Program for the Employment-Disadvantaged. Under Career-Access, the employment must be full-time, except for disabled persons and students in work-study situations, and it must provide learning and work experience with on-the-job supervision. The program also provided employment services under the Industrial and Labour Adjustment Program, the Canada Industrial Renewal Program, and the Manpower Consultative Service.

Employers could be businesses, organizations, or individuals in business for six months or more. Municipalities were eligible to become employers if provincial governments raised no objection. Federal departments and agencies were eligible employers for students returning to school.

Employers' wage subsidies could range up to 12 months and could be equal to as much as 85 per cent of employees' gross wages, up to a maximum of $500 per week. The maximum wage contribution per subsidized employee was $15,000.

The subsidy payable varied with the characteristics and needs of the program participants. In addition to the contribution for wages, $10,000 per establishment could be contributed for restructuring the workplace or for providing special equipment to allow for the hiring of disabled persons. Protective clothing could be provided to a subsidized employee up to a cost of $100. Employers of nonprofit or charitable organizations could receive an additional $80 per subsidized employee per week for costs incurred as a result of the placement. The maximum amount per subsidized employee was $30,000.

When an association composed of more than one community group or agency was working on behalf of program clientele at the metropolitan, provincial, or territorial levels, it could receive up to $100,000 for 12 consecutive months. A single community group or agency could receive a $50,000 contribution for the same period.

The Voluntary Initiatives Program (VIP), delivered through the Career-Access program, was introduced in the summer of 1984 on an experimental basis, with the objective of providing an opportunity to those on unemployment insurance to perform useful and productive activities with charitable organizations.

Participants in the VIP continued to receive their regular unemployment insurance benefits plus an enhancement. Placements lasted from six to 50 weeks. Organizations received up to $50 per participant weekly to contribute to the additional costs actually incurred.

In the *United States*, the work incentive tax credit (WIN), enacted in the *Revenue Act* of 1971, provided a subsidy through the income tax system in the form of nonrefundable credits. The work incentive tax credit, a nation-wide categorical subsidy, paid firms that hired welfare recipients enrolled in the work incentive program and required that they be retained for two years. It provided a 20 per cent tax credit up to a limit of $1,000 on the annual wages of each employee, with the rate falling to 10 per cent after a firm's credits for the year reached $25,000. The program was changed in 1975 to extend it to all welfare recipients covered under the aid to families with dependent children and, in 1979, to increase the tax credit to 50 per cent of wages up to $6,000 for the first year of employment and 25 per cent of wages up to $6,000 for the second year.

The New Jobs Tax Credit (NJTC) in the United States was one of the four programs in the 1977 economic stimulus package. It was a temporary, general, marginal-employment subsidy program, providing tax credits for firms that increased their employment in tax years 1977 and 1978. The program was general in that it subsidized employment without regard to the personal characteristics of the unemployed. It was incremental in that, in order to avail itself of the subsidy, a firm had to increase the size of its work force above a predefined level. The program had the following

key provisions. First, the credit was limited to the lower of either 50 per cent of the excess over 105 per cent of the previous year's total wages or 50 per cent of the excess of wages covered by the federal unemployment insurance (FUTA) wages in the 1977 or 1978 tax year over 102 per cent of FUTA wages from the previous year. Second, the total amount of the tax credit was limited. The credit could not exceed the lower of 25 per cent of FUTA wages or $100,000. Third, a main feature of the program was the varying employment base against which employment must be compared in order to receive the tax credit. The tax credit applied only to tax years 1977 and 1978. Since the base year over which employment must expand in order to receive a tax credit moved forward with each new tax year, this meant that the credit was received only in the year that new employees were hired. Finally, the program contained a special uncapped, additional 10 per cent credit for hiring certain handicapped workers (Ashenfelter, 1978a). The program turned out to be an ambitious federal wage subsidy program, paying benefits of $2.3 billion in 1977 and $4.5 billion in 1978.

The Targeted Jobs Tax Credit (TJTC) program replaced the NJTC. It was originally available for the 1979 and 1980 tax years but later extended to the 1985 tax year. The program subsidized wages paid during 1979-81 for certified employees hired after September 26, 1978. This subsidy, unlike the NJTC, was targeted at special groups of workers: welfare recipients, the handicapped, Vietnam veterans, and youths who were economically disadvantaged or taking part in co-operative programs. To prevent targeted workers from substituting for nontargeted workers, the program provided a limited tax credit equal to 50 per cent of wages up to $6,000 in the first year, and to 25 per cent of wages up to $6,000 in the second year. Tax expenditures on the TJTC amounted to about $365 million per year. The program expired in December 1985.

In the *United Kingdom*, the Temporary Employment Subsidy, a marginal redundancy-averting scheme, was introduced in 1975. Its purpose was to forestall planned layoffs. Eligible employers received £20 per week (about 30 per cent of the wage costs) for up to one year for workers who would otherwise be laid off. However, if the job remained at risk at the end of this period, a subsidy of £10 per week was paid for an additional six months. In order to be eligible, an employer had to give advance notification of layoffs to the government. The local union had to certify the impending layoffs.

On the other hand, the 1977 British Small Firms Employment subsidy scheme was both marginal and targeted. It was marginal in that the subsidy was paid for each additional full-time job above the base on a given date. It was targeted at manufacturing firms with fewer than 50 employees and located in "designated development areas." Eligible firms received £20 per week for a maximum of 26 weeks for each job added after March 29, 1977. Later, the coverage of the scheme was broadened to include small manufacturing firms throughout Great Britain and nonmanufacturing firms in designated development areas.

In *West Germany*, a temporary targeted recruitment subsidy with a marginal stock constraint was introduced in 1974. For six months, a wage subsidy of 60 per cent was paid to firms that hired registered unemployed workers with more than 12 weeks of joblessness in designated high-unemployment regions. The hiring decision could be made at any point during the scheme's six-month duration. The base level of employment was set at that of a date prior to the passage of the legislation.

In *France*, the Incentive Bonus for job creation offered all private-sector firms a subsidy of F500 per eligible worker per month for expansion over and above the firm's employment level on June 4, 1975. Designed to last only until November 30, 1975, the program was extended through 1977 for firms with less than 10 employees. In 1977 the base level of employment was subsequently brought forward to that on January 26, 1977. In 1978 the French government introduced the second national pact, a marginal-employment subsidy scheme, targeted at young workers (under 25). Employers were exempted from their social security contributions on the wages of eligible workers hired between July 1978 and December 1979. The scheme acted as a marginal stock subsidy: to be eligible, the firm had to increase its total employment.

A detailed outline of wage subsidy schemes enacted between 1970 and 1983 in Canada, the United States, the United Kingdom, and Japan is given in Appendix A.[2]

In closing this review of wage subsidies, the following observations may be noted.

First, while most countries have used wage subsidy schemes in one form or another, some countries – Belgium, France, Sweden, the United Kingdom, Canada, and the United States, in particular – have experimented with a large variety of schemes (Table 2-2).

Second, recruitment subsidy schemes have been the predominant form in most countries, followed by marginal-employment subsidy schemes and redundancy-averting subsidy schemes, which have been most popular in the Netherlands, Sweden, and the United Kingdom (Table 2-2).

Third, most of the programs have been targeted at young people, a group that has experienced excessively high rates

Table 2-2

Summary of Wage Subsidy Programs in Selected Industrialized Countries, 1970-83

	Type of program			
	Recruitment	Incremental	Redundancy-averting	Total
Belgium	4	2	–	6
Denmark	3	2	–	5
Finland	2	1	1	4
France	5	1	1	7
Ireland	–	2	1	3
Italy	1	–	–	1
Japan	3	–	1	4
Netherlands	3	1	2	6
Norway	2	–	–	2
Sweden	2	4	3	9
United Kingdom	6	1	4	11
West Germany	2	1	–	3
Canada	5	2	–	7
United States	6	1	–	7

SOURCE Based on United Nations (1984); OECD (1982); and Employment and Immigration Canada, *Annual Report*, various years.

of unemployment. To a lesser degree, wage subsidy schemes have focused on the long-term unemployed (Table 2-3).

Fourth, while some countries (such as the United Kingdom) have favoured short-term subsidies – those lasting less than one year – to preserve or create jobs during a period of temporary labour-market slack, other countries (notably Belgium and Sweden) have implemented programs whose period of subsidization exceeded two years to improve the employability of structurally disadvantaged groups (Table 2-4). Finally, most schemes have taken the form of cash grants to eligible employers, except the recent U.S. and Canadian tax credits, and the French and Belgian social-security-tax-exemption schemes.

Economic Rationale for Wage Subsidies

The economic rationale for wage subsidies is straightforward: by lowering the price of labour relative to that of other

Table 2-3

Wage Subsidy Programs in Selected Industrialized Countries, by Target Group, 1970-83

	Youth	Unemployed	Long-term unemployed	Other	No restrictions	Total number of programs[1]
Belgium	3	1	2	–	–	6
Denmark	4	–	1	–	–	5
Finland	1	1	–	1	1	4
France	6	–	–	–	2	7
Ireland	1	1	–	1	1	3
Italy	1	–	–	–	–	1
Japan	–	1	–	2	1	4
Netherlands	2	–	1	2	2	6
Norway	2	–	–	–	–	2
Sweden	2	1	1	4	3	10
United Kingdom	6	1	1	–	4	12
West Germany	–	–	1	–	2	4
Canada	1	5	–	4	–	7
United States	2	1	–	3	1	7

1 The figures may not add up to the totals because some programs include more than one group.
SOURCE Based on United Nations (1984); OECD (1982); and Employment and Immigration Canada, *Annual Report*, various years.

Table 2-4

Wage Subsidy Programs in Selected Industrialized Countries, by Duration of Subsidy, 1970-83

	Less than 1 year	1 year	18 months	2 years	More than 2 years	Not known	Total number of programs[1]
Belgium	1	1	–	2	3	–	6
Denmark	1	1	–	–	–	3	5
Finland	–	1	1	–	2	–	4
France	2	2	–	2	–	1	7
Ireland	–	–	1	1	–	1	3
Italy	–	–	1	–	–	–	1
Japan	2	2	1	–	–	–	4
Netherlands	–	2	–	–	–	4	6
Norway	2	–	–	–	–	–	2
Sweden	3	–	–	–	3	4	10
United Kingdom	5	3	1	–	–	3	12
West Germany	1	–	1	2	–	–	4
Canada	2	6	–	–	–	–	7
United States	1	1	2	–	–	3	7

1 The figures may not add up to the totals because some programs include more than one period of entitlement.
Source Based on United Nations (1984); OECD (1982); and Employment and Immigration Canada, *Annual Report*, various years.

inputs in the production process, wage subsidies encourage the substitution of labour for these other factors of production (for example, capital), with an accompanying increase in employment and decrease in unemployment. Wage subsidies may also affect the scale of production by inducing firms to produce more goods. If part or all of the lowered labour cost is passed on to the consumer in the form of lower product prices, the demand for the product may increase, causing increases in output as the extra spending spreads throughout the economy.

In inflationary circumstances, while employment is increased and unemployment is reduced – the major objective of wage subsidy programs – it is possible that increased employment can be achieved with lower inflationary pressures. The basic strategy is simple: by targeting such programs at workers who are relatively disadvantaged because of high unemployment, less bargaining power, rigid wages, or other characteristics, no upward pressure is generated on wage costs in the aggregate. Thus, substantial increases in both the employment of these workers and GNP could occur without substantial upward wage pressure. Some economists have referred to this as "cheating the Phillips curve" (the classical trade-off between unemployment and inflation) by concentrating employment increases on sectors of the labour market that experience excess supply (Baily and Tobin, 1977). For the long run, it means diminishing the natural rate of unemployment[3] (the rate of unemployment that does not accelerate inflation) and increasing the potential GNP.

Further, wage subsidy policies may well have favourable effects on the country's balance of payments at any given exchange rate. For firms engaged in international trade, a wage subsidy policy operates as an export subsidy. Indeed, for a number of western European countries, this characteristic has been viewed as a primary rationale for wage subsidy programs (Bishop and Haveman, 1979). A subsidy, by lowering the costs of production, may enable domestic producers to better compete in export markets. The available estimates suggest that in the United Kingdom, the balance-of-payment effect of a marginal-employment subsidy equal to one-third of average earnings is equivalent to a devaluation of about 1.5 per cent (Layard and Nickell, 1980). The 1975 British Temporary Employment Subsidy was discontinued after four years as a result of complaints from the Commission of the European Economic Community that it conferred an unfair trade advantage upon British firms. It was found that during the period 1975-78 the export performance of the United Kingdom improved, while import penetration declined (Deakin and Pratten, 1981).

Finally, in addition to its effects on actual and potential GNP and prices, and, at the same time, to increased employment with beneficial balance-of-payment effect, targeted wage subsidy policies tend to shift the composition of employment and earnings towards low-skilled, low-wage, target-group workers. If promoting more equitable distribution of income is one of the desired goals, this is a major benefit.

Evaluating the Impact of Wage Subsidies

Impact assessments of wage subsidy programs are almost nonexistent. Most European evaluations have been confined to sample surveys of employers who had received subsidies. The results of the sample surveys are not fully reliable as the employers, for obvious reasons, have an incentive to respond erroneously. These evaluations have focused on program design, control, and administration in order to improve the administrative effectiveness of the schemes. There have been no attempts to estimate the employment, efficiency, inflationary, or distributional effects of employment subsidies. Nevertheless, some studies have attempted to estimate the net employment effects of wage subsidies by taking into account various factors such as "churning," displacement, and deadweight costs. A discussion of their results is postponed until Chapter 5. However, none of these studies have used a general-equilibrium model. In order to estimate accurately the net effects of a wage subsidy policy, a fully specified general-equilibrium model is necessary.

Some attempts have been made to estimate the macroeconomic effects of hypothetical wage subsidy policies on aggregate employment, output, wage and price levels, and net government revenue. A study using an aggregate macroeconomic model measured the multiplier effects of a hypothetical tax credit with a variable base level and discovered that, for the United States, such a policy would have significant effects on employment, output, and prices at a relatively small net cost to government (Fethke and Williamson, 1976).

Another U.S. study analysed the relative effectiveness of an investment tax credit versus an employment tax credit (Kesselman, Williamson, and Berndt, 1977). For the period 1962-71, the study simulated the impact on U.S. manufacturing output of replacing the investment tax credit with an employment tax credit of equivalent cost to the government. The main conclusions were that total employment would have been from 0.5 per cent to more than 1 per cent higher in many of the years under study; that use of capital services would have been from 1 to 6 per cent lower during the period; and that an employment tax credit would have induced firms to substitute blue-collar workers for capital and white-collar workers.

More recently, a study investigated the macroeconomic effects of wage subsidy options (Burdett and Hool, 1982) and concluded that these subsidies are especially potent tools for achieving employment, price-level, and distributional goals during both the upswing and downswing phases of the cycle, with aggregate demand policies being more effective at the trough and peak.

Finally, a study estimated the economic impact of a proposed marginal-employment subsidy on the basis of a simple algebraic model of the economy (see Layard and Nickell, 1980; for a critical response to this case, see Whitley and Wilson, 1983, Layard and Nickell, 1983, and Luskin, 1986). Under such a scheme, firms would be entitled to receive a subsidy for each additional job created above a given reference level of employment. This analysis concluded that a marginal-employment subsidy would have significant expansionary effects. The scheme compared quite favourably with alternative means of stimulating employment (such as an increase in government expenditures) and, in particular, with the policy of a general employment subsidy. Subsequent studies, however, claimed that marginal-employment subsidies are less effective than shown above.

While discussing macroeconomic evaluations of wage subsidy programs, one problem deserves a special mention. The treatment of government budget effects in these studies, in general, is found somewhat less clear. Increases in public expenditures on a wage subsidy program must be financed by changes elsewhere in the government budget (tax increases, expenditure cuts, borrowing), to the extent that their stimulative effects do not induce increases in tax revenue such that the program "pays for itself." A more explicit treatment of the budget constraint issue is desirable.

In this study, we use the micro benefit-cost approach to analyse the specific, direct, indirect, and dynamic benefits and costs of an employment subsidy. Within this focus, we have made an attempt to be selective but reasonably comprehensive, with emphasis on those issues and items that are of most interest to policy makers. This approach, however, is not without its limitations. The purpose here, however, is not to review these limitations comprehensively but to highlight two issues that are particularly important to the evaluation of subsidies. First, since costs and benefits are generally presented in aggregate terms, distributional questions are difficult to handle in a benefit-cost framework. Second and one of the most difficult problems is the treatment of expectations. The nexus of the problem is that the behaviour of the firms and workers would be altered if they anticipated some form of government subsidy (OECD, 1983). Suppose, for example, that a firm is faced with declining demand due to a shift in comparative advantage. If no direct or indirect subsidy is anticipated, the firm's output and employment would contract. As workers anticipate job losses, they will seek employment opportunities elsewhere. In the presence of subsidy expectations based on government policy in the past, however, the firms may alter their employment and output behaviour. On the other hand, anticipation of such assistance may affect the workers' adjustment process.

3 The Employment Tax Credit Program

Spurred by the introduction of the New Jobs Tax Credit program in the United States, representatives of the Canadian Federation of Independent Business in September 1977 presented a brief to the federal government in which they argued for immediate implementation of a Canadian employment tax credit program in order "to meet the twin requirements of increasing employment and reducing inflationary pressure." The federal government responded by introducing the Employment Tax Credit Program (ETCP) in March 1978 to generate employment in the private sector of the economy. The employment tax credit is a form of marginal-employment subsidy that operates through a business tax credit. The use of an employment tax credit for fiscal stimulation was a relatively novel effort.

The main objective of the ETCP was to "stimulate incremental employment in the private sector." A potential by-product of the program was "to improve future employability of participants above that which would have occurred in its absence."

Period of Validity, Form, and Amount of Subsidy

The program provided a tax credit of $1.50, $1.75, or $2.00 per hour, with higher rates for higher-unemployment areas, to employers who would create jobs defined as additional to their normal work force – i.e., jobs that would not have existed in the absence of the program. The maximum credit of $2.00 per hour per employee was given to the four Atlantic provinces and the Gaspé region (these regions were also entitled to a 20 per cent investment tax credit). In designated areas of Quebec, Saskatchewan, Manitoba, Ontario, Alberta, and British Columbia (entitled to a 10 per cent investment tax credit), the rate was $1.75 per hour. In all other areas (entitled to a 7 per cent investment tax credit), the rate was $1.50 per hour.

It was anticipated by the federal government that employers would create close to 50,000 jobs across Canada each year as a result of the subsidies, at an annual net cost to the Treasury of approximately $100 million. Authorization for the program came from the *Employment Tax Credit Act*, which set out its basic structure (EIC and Revenue Canada, 1978). The ETCP was originally designed to be a two-year program, but it was extended for a third year and was terminated at the end of March 1981.

Conditions for Obtaining a Subsidy

Under the ETCP, an eligible employer could claim a tax credit for each hour of eligible employment by an eligible worker, up to a maximum of 40 hours per week, for a period not exceeding nine months (later changed to 12 months). The terms were defined as follows:

- An "eligible employer" was one who had been carrying on business in Canada for more than 52 weeks immediately preceding the date of participation in the ETCP. The only exception to the above was a person operating an employment or temporary help agency, where the employees would be required to work for or under the supervision of another employer.

- An "eligible worker" was a Canadian citizen or permanent resident of working age, who had been unemployed and registered with a Canada Employment Centre (CEC) as actively seeking work for eight consecutive weeks or more (later changed to two weeks or more), and who had been referred to the eligible employer by a CEC. If an employer finds a suitable and eligible worker, the employer may ask a local CEC to refer that worker to them.

- An "eligible employment" was any job created that met the following conditions: a) it was the result of the tax credit offered by the program – i.e., the employment was additional to the normal work force of the employer; b) the weekly hours of work available to the eligible worker were normally not less than 35; c) the job paid at least the appropriate minimum wage or an hourly wage that exceeded the rate of the tax credit by $0.25 per hour if the job was not subject to minimum-wage legislation; d) the employment lasted for a minimum of three consecutive months; and e) the employment was not directly subsidized by any other government program.

Methods of Operation

Firms recovered a tax credit by deducting it from their federal income tax. Any company paying taxes by instalment could deduct, at the time of each payment, the amount of tax credit for which it had become eligible but

which it had not yet claimed. The tax credit was taxable, however, and employers had to add an equivalent amount to their taxable income. To understand its operation, consider a firm receiving a credit of $1.75 per hour for 40 hours a week during 12 months. The total credit is thus $1.75 × 40 × 52 = $3,640. The tax credit must be added to income. If the firm is paying taxes at a 40 per cent rate, the net credit available is $3,640 – (0.40 × $3,640) = $2,184 per new employee. If a firm's federal income tax was less than the total amount of the tax credit earned in the year, it was allowed to carry all or part of the tax credit forward, up to a maximum of five years. The credit was neither transferable nor refundable.

Employers were given detailed instructions on how to calculate the size of their "normal work force" – the standard against which they were to compare the number of their employees during each week of the ETCP agreement in order to determine their allowable tax credit for that week. Briefly, two types of "normal work force" were identified: a "nonfluctuating" work force and a "fluctuating" work force (the latter referring to work forces that had increased by over one-third during the preceding 12-month period). All firms that normally employed less than 10 persons were considered as having "nonfluctuating" work forces.

Program Modifications

The original expectation that the ETCP might be able to create close to 50,000 jobs per year was not realized during its first year of operation: only 19,934 jobs were approved. The employers' response to the program was not encouraging, despite the fact that a nation-wide advertising campaign (at a cost of $800,000) was launched by Employment and Immigration Canada in May 1978. Concern over this situation led to a survey of employers during June 1978 in an attempt to identify the factors associated with the apparent lack of interest. The survey revealed that the majority of companies viewed the program favourably, but that some had objections to the low level of subsidy (i.e., the size of the tax credit); to the requirement that the new employees had to have been unemployed for a period of at least eight weeks prior to being hired; and to the requirement that the job be incremental in nature and be certified as such by the employer in the agreement to hire. Some employers feared an audit by Revenue Canada Taxation. The employers' reluctance to participate resulted in a very slow takeoff of the program: by the beginning of August 1978, only 5,000 jobs had been approved.

Specific program-design changes[1] were initiated in the fall of 1978, and a second advertising campaign to promote employer and public awareness of the revised ETCP was implemented in October 1978 at a cost of $490,000. The modified program included provisions to extend the duration of the subsidy from nine to 12 months, and to reduce the eight-week "unemployment qualification" period for all eligible workers to two weeks.

In response to program changes, acceptance of the program increased markedly. By the end of December 1978, 11,168 jobs had been approved; and in the final quarter, a further 8,766 jobs were approved, for a total of 19,934 by the end of March 1979.

In closing the discussion of the main features of the ETCP, the following points should be noted: First, the subsidy was paid to employers rather than workers, which would shift the demand, rather than the supply, curve of labour. By lowering the firm's net costs of employing labour, the ETCP might induce a shift away from capital towards labour within the firm. Second, a fixed-dollar subsidy under the ETCP would result in a relatively higher subsidy for unskilled labour than for skilled workers. Third, the ETCP provided a marginal credit that affected incremental hirings rather than a wage subsidy covering total employment. Fourth, the rules provided an additional stimulus to growing industries and, to a lesser extent, to small establishments. Finally, since the program was temporary, there was no reason to expect firms to provide extensive on-the-job training to subsidized workers.

Descriptive Statistics

Though the initial employer response to the program was disappointing, in fiscal years 1979/80 and 1980/81 the initially expected target of 50,000 jobs annually was attained. By the end of the program, some 113,182 jobs had been created. Table 3-1 shows the number of jobs created per year under the program.

Table 3-1

Number of Jobs Created under the ETCP, 1978-81

	Jobs created	Number of employers	Number of agreements
1978/79	17,337[1]	7,217	12,506
1979/80	48,427	19,027	37,194
1980/81	47,418	18,575	36,621
Total	113,182	44,819	86,321

1 There were 19,934 jobs approved by the end of March 1979.
Source Unpublished data supplied by Employment and Immigration Canada.

Some 64.4 per cent of these jobs were created in regions where the tax credit rate was $1.50 per hour; 26.2 per cent in regions with a rate of $1.75 per hour; and 9.4 per cent in regions with a rate of $2.00 per hour (Table 3-2).

Table 3-2

Distribution of Jobs Created under the ETCP, by Tax Credit Rate, 1978-81

	1978/79	1979/80	1980/81	Total
		(Per cent)		
Tax credit rate:				
$1.50	56.0	64.9	67.4	64.4
$1.75	32.8	26.1	23.6	26.2
$2.00	11.2	9.0	9.0	9.4
Total	100.0	100.0	100.0	100.0

Source: Unpublished data supplied by Employment and Immigration Canada.

Table 3-3

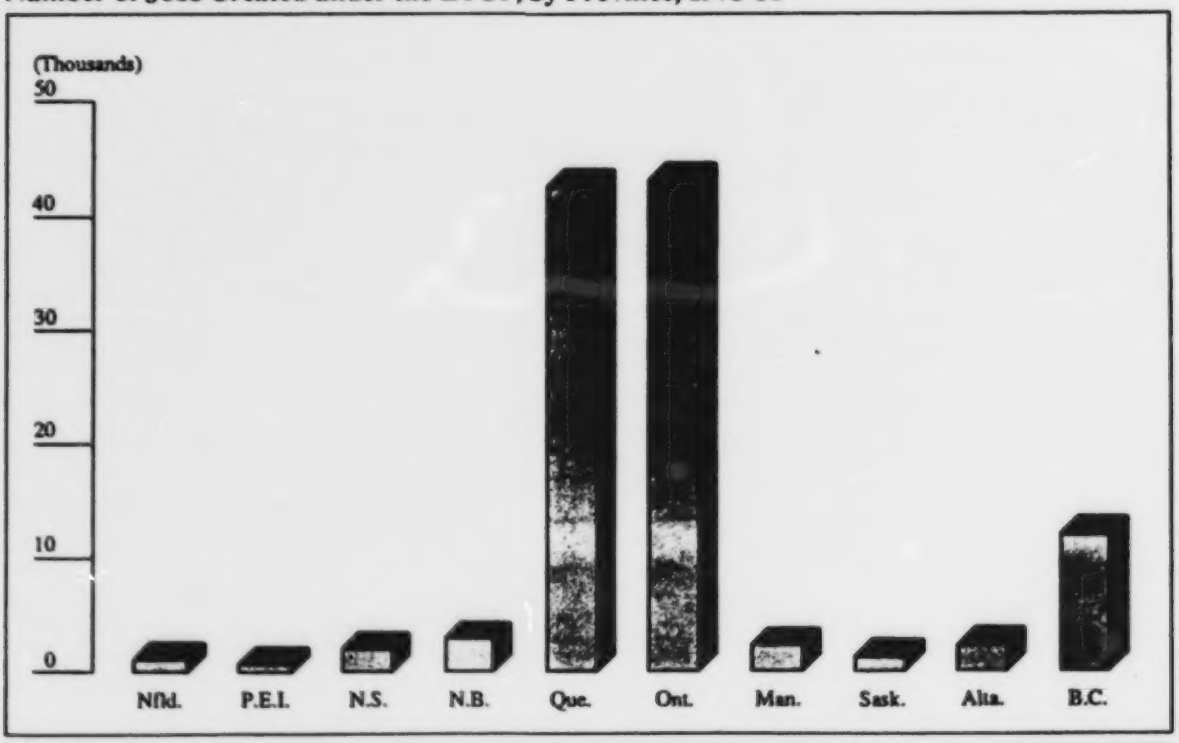
Number of Jobs Created under the ETCP, by Province, 1978-81

	Number of jobs	Number of employers
Newfoundland	1,360	753
Prince Edward Island	655	333
Nova Scotia	2,362	1,263
New Brunswick	3,262	1,210
Quebec	42,699	16,213
Ontario	43,553	16,251
Manitoba	2,625	1,189
Saskatchewan	1,629	1,084
Alberta and the Northwest Territories	2,617	1,516
British Columbia and the Yukon	12,420	5,007
Canada	113,182	44,819

Source: Unpublished data supplied by Employment and Immigration Canada.

Chart 3-1

Number of Jobs Created under the ETCP, by Province, 1978-81



The provincial breakdown of jobs created under the ETCP shows a particularly strong use of tax credits in Ontario and Quebec, followed by British Columbia, Alberta, and New Brunswick (Table 3-3 and Chart 3-1).

During the period 1978-84, tax credits totalling $93.6 million were claimed by participating corporations. The data on the use of this program, reported in Table 3-4, indicate that the benefits paid under it were low throughout its life. In its peak tax year (1980), $26.9 million in credits was claimed by 6,980 corporations. The average amount of tax credit claimed by large corporations (with assets over $25 million) was much higher than that claimed by small corporations (with assets under $1 million).

Unpublished figures shown in Table 3-5 indicate that the average amount of employment tax credits claimed by corporations with assets of more than $25 million was $23,000 and $41,368 in 1983 and 1984, respectively, compared with $3,403 and $4,724 for all corporations.

Characteristics of Program Participants

The data pertaining to the characteristics of program participants were provided by Employment and Immigration Canada. The basic data on each employer and employee were drawn from the Agreement (EMP 2204) and the Notice of Hiring Form (EMP 2280). The employer data were supplemented by a questionnaire mailed to 4,006 participating firms in March 1979. The survey had a response rate of 65 per cent. Supplementary data on employee characteristics were also obtained through a mail survey covering the periods July 1978 and October 1979. Though the response rate to this survey was low (27 per cent), 4,807 employee questionnaires were received. Additional information on a 10 per cent sample of employee participants was generated by the Department from its longitudinal Labour Force Data Base. This data base contains records of employment and participants' interactions with the Unemployment Insurance Program.

Table 3-4

Tax Credit Claimed under the ETCP, 1978-84

	Number of corporations claiming a tax credit[1]	Amount of credit claimed
		(Millions of $)
Tax year:		
1978	660	1.6
1979	4,235	16.5
1980	6,980	26.9
1981	6,458	25.7
1982	3,362	11.2
1983	1,622	5.5
1984[2]	1,099	5.2

1 Based on all corporations filing a T2 return for the tax year.
2 Preliminary data, subject to minor changes.
Source Unpublished data supplied by Revenue Canada.

Employers

The results of the employer survey of first-year participants indicate that the program attracted small enterprises

Table 3-5

Tax Credit Claimed under the ETCP, by Corporation Size, Tax Years 1983 and 1984

	Number of corporations			Amount of credit claimed	
	1983	1984	Total	1983	1984
				(Millions of $)	
Size of corporation:					
Small[1]	1,300	836	2,136	2.7	1.8
Medium[2]	298	244	542	2.3	2.6
Large[3]	24	19	43	0.6	0.8
Total	1,622	1,099	2,721	5.5	5.2

1 Less than $1 million in assets.
2 $1 million to $25 million in assets.
3 More than $25 million in assets.
Source Unpublished data supplied by Revenue Canada.

Table 3-6

Distribution of Participants Hired under the ETCP, by Size of Firm, 1978/79

	Hirings	Average hiring per firm
	(Per cent)	
Number of permanent full-time employees:		
None	1.8	1.5
1 to 5	16.9	1.4
6 to 20	22.6	2.2
21 to 50	13.0	3.7
51 to 150	23.6	10.2
151 to 300	11.1	16.1
301 to 500	6.5	21.9
More than 500	4.5	28.3
Total	100.0	3.3

Source: Employer survey conducted by Employment and Immigration Canada.

for the most part: some 77 per cent of participating firms employed fewer than 20 employees, and 40 per cent of employers had a maximum of only five full-time employees. Small firms (fewer than 20 employees) created a substantial portion of the jobs under the program. Based on our sample, of all the jobs created in the first year of the program, about 40 per cent were created by firms with 20 or fewer employees, and approximately 80 per cent by firms with 150 or fewer employees (Table 3-6). Job creation by small firms under the ETCP was significantly higher than their share of total employment in the economy (24 per cent). Recent research has shown that small firms are the most dynamic when it comes to hiring and firing. Smaller businesses more than offset their higher failure rates with their capacity to start up and expand dramatically (Birch, 1981).

Table 3-7 shows the distribution of employers according to the number of jobs created. Some 63 per cent of employers created one job, while a total of 92 per cent created five jobs or less. Close to 70 per cent of the agreements to hire were for the maximum contractual period of 12 months. Nearly half the employment was provided by firms in the manufacturing sector. Retail and wholesale trade accounted for about 19 per cent; community, business, and services, for about 14 per cent; and the construction industry, for 8 per cent (Table 3-8).

The manufacturing industry was significantly over-represented in the program in comparison to its share of total employment in the economy (for example, 20 per cent in 1979). In contrast, service industries, with only about 36 per cent of ETCP hirings, were under-represented.

Table 3-9 provides the breakdown of ETCP employment by occupation; the results show that the majority of new jobs are in the manual-occupations group. Within this group, the fabricating and assembly category accounts for about 26 per cent, followed by the processing and machining category at about 16 per cent. Within nonmanual

Table 3-7

Distribution of Employers Participating in the ETCP, by Number of Jobs Created, 1978/79

	Distribution of employers
	(Per cent)
Number of jobs created:	
1	63.3
2 to 5	29.0
6 to 10	4.3
11 to 20	1.8
More than 20	1.6
Total	100.0

Source: Employer survey conducted by Employment and Immigration Canada.

Table 3-8

Distribution of Hirings under the ETCP, by Industry, 1978-81

	Hirings		
	1978/79	1979/80	1980/81
	(Per cent)		
Primary industries	3.0	3.4	3.0
Manufacturing	56.0	47.3	48.6
Construction	5.8	7.9	6.3
Transportation, communication, and other utilities	2.1	2.3	2.2
Trade	17.0	19.5	20.0
Finance, insurance, and real estate	2.4	2.2	2.3
Community, business, and personal services	9.5	13.2	15.5
Public administration	–	–	–
Other	4.2	4.2	2.1
Total	100.0	100.0	100.0

Source: Unpublished data supplied by Employment and Immigration Canada.

Table 3-9

Distribution of Jobs Created under the ETCP, by Occupation, 1978-81

	1978/79	1979/80	1980/81
		(Per cent)	
Managerial and administrative	1.2	1.8	2.1
Engineering and mathematics	1.5	2.3	3.1
Medicine and health	0.6	0.7	0.9
Performing arts	0.7	0.6	1.0
Clerical	13.2	15.0	15.9
Sales	6.6	7.1	7.4
Services	3.2	5.1	5.7
Farming, fishing, and forestry	2.1	3.2	1.8
Processing	9.6	8.7	7.8
Machining	9.0	7.8	7.9
Fabricating and assembly	27.9	23.1	25.7
Construction	7.3	8.2	5.9
Material handling	7.1	6.8	7.1
Other	10.0	9.6	7.7
Total	100.0	100.0	100.0

Source: Unpublished data supplied by Employment and Immigration Canada.

occupations, the clerical, sales, and services occupations account for about 26 per cent, and the professional category for about 6 per cent.

Employees

The employee survey results showed that females were under-represented in the program by comparison to their share of the unemployed. Only about one-third of the ETCP employees were female, while their share of the unemployed was 45 per cent. More than half of all participants (54 per cent) were under 25 years of age, with 35 per cent of all participants being between the ages of 20 and 24 (Table 3-10). Seventy-three per cent of the participants had

Table 3-10

Distribution of Participants in the ETCP, by Sex and Age, 1978/79

	Male	Female	Total
		(Per cent)	
Age group:			
15 to 19	18.7	21.2	19.5
20 to 24	34.5	35.0	34.7
25 and over	46.8	43.8	45.8
Total	100.0	100.0	100.0

Source: Employee survey conducted by Employment and Immigration Canada.

Table 3-11

Employment Status of Participants Prior to Present ETCP Job,[1] 1978/79

	Male	Female	Total
		(Per cent)	
Employed full time (35 hours or more per week)	21.3	18.9	20.4
Employed part time (less than 35 hours per week)	4.0	7.5	5.4
Temporarily laid off	5.2	3.6	4.6
Unemployed and seeking work	54.5	48.2	51.9
Unemployed and not seeking work	0.7	2.1	1.3
In school full time	4.8	6.7	5.5
In Canada Manpower Training Program	2.4	2.2	2.3
Other	7.1	10.8	8.6
Total	100.0	100.0	100.0

1 Sample based on replies from 4,750 participants.
Source: Employee survey conducted by Employment and Immigration Canada.

no dependents, and only 17 per cent had a grade 8 education or less.

Perhaps the most important result to emerge from the employee survey is that about 20 per cent of the ETCP participants surveyed were in full-time employment and

Table 3-12

Main Source of Income of Participants Prior to Employment under the ETCP,[1] 1978/79

	Male	Female	Total
		(Per cent)	
Earnings from employment or self-employment	15.8	13.6	14.9
Unemployment insurance benefits	52.3	42.3	48.3
Welfare	3.8	3.3	3.6
Mother's allowance	0.7	1.7	1.1
Support from other member of family	6.0	16.3	10.2
Pension	0.5	0.5	0.5
Savings	9.4	5.4	7.8
Other	11.5	16.9	13.7
Total	100.0	100.0	100.0

1 Sample based on replies from 4,750 participants.
Source: Employee survey conducted by Employment and Immigration Canada.

approximately 5 per cent were employed part-time at the time of joining the program. Approximately 58 per cent joined the ETCP from the unemployment ranks, with a further 8 per cent coming from school/college and manpower training programs (Table 3-11).

The employee survey results showed that almost half of the participants (48 per cent) in the first year of the program were drawing unemployment insurance (UI) benefits just before commencing their ETCP job, while 75 per cent had drawn UI benefits during the previous 18 months. On average, participants who had been drawing UI benefits had been unemployed for 23 weeks between the termination of their previous job and the beginning of their new job under the ETCP. During this period, these employees drew UI benefits for an average of 20 weeks and received $1,877. About 5 per cent of participants were receiving welfare allowances prior to joining the ETCP. Assistance by other family members, savings, or pension earnings were the main source of income for the remaining 45 per cent (Table 3-12).

On average, those ETCP participants who had earnings below the maximum UI insurable earnings level in their previous job earned $162 per week in their last job – $175 for males and $134 for females. Approximately 90 per cent of all the ETCP participants had earnings below the maximum level. The subsidized ETCP job paid, on average, $171 a week.

About 8 per cent of the ETCP workers had received training under the Canada Manpower Training Program before they were hired by ETCP employers – 11 per cent of the males and 4 per cent of the females.

4 The Efficiency Basis of the Employment Tax Credit Program

In this chapter, we evaluate the efficiency basis of a wage subsidy policy such as the ETCP. Can employment subsidy measures provide any benefit to society? In other words, is there a role for wage subsidy policy? The test is, of course, whether it can raise the level of societal welfare. In competitive markets with flexible prices and in the absence of distortions, a wage subsidy policy would introduce inefficiency and lower welfare (Jackman and Layard, 1980) – i.e., it would result in a net cost to society. However, in the presence of distortions in the labour market – taxes, for example – can a wage subsidy policy reduce this efficiency cost?

To properly evaluate the net benefits to society of a wage subsidy that increases employment in a specific sector, one must analyse the social opportunity cost of that labour (Treasury Board Secretariat, 1976). But first, a fundamental question must be asked: Why is there a need for the concept of social opportunity cost? The answer is that the need for this concept arises when market prices do not fully reflect social opportunities. The simplest case of this is when the presence of a distortion (for example, the presence of a monopoly or of quotas) causes a divergence between the demand price and the marginal cost. In labour markets, the existence of distortions that cause unemployment, for example, may create a divergence between demand and supply prices or wage rates. According to Harberger (1971*b*), the true purpose behind the use of social opportunity costs in the evaluation of investment projects is that "where there is an excess of wages actually paid over social opportunity costs, this excess should be counted as part of the benefits of the project. Put another way, instead of counting against the project all of its wage costs, we charge it only with that part which represents the true social opportunity cost."

The Social Opportunity Cost of Labour

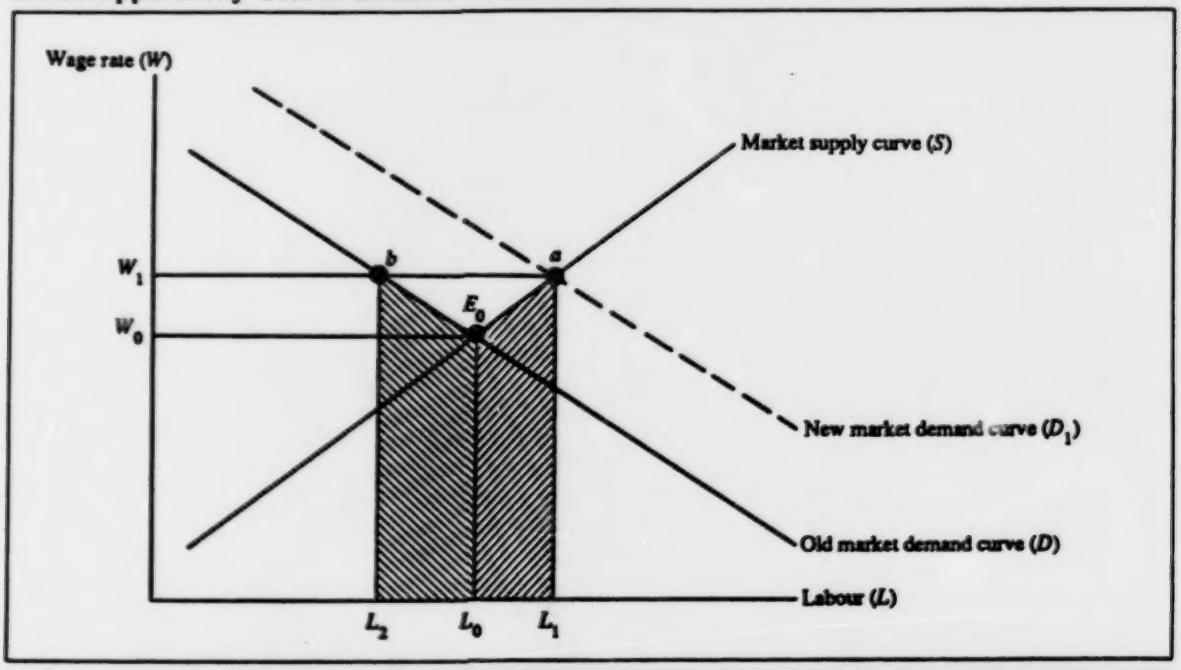
In the absence of any distortion, the fundamental determinant of the social opportunity cost of labour is the competitive supply price at which labour of a certain type will make itself available for employment in a particular area (Harberger, 1971*b*; Jenkins and Kuo, 1978; Harberger, 1980). To illustrate, consider Chart 4-1, which indicates the demand for a certain class of skilled labour in a particular region, as well as the supply. Let us assume that there are no distortions present in this market. The labour market reaches full employment equilibrium at the market clearing wage W_0, yielding a quantity of demand and supply of labour of L_0 persons. Say the region decides to build a subway system. This incremental source of labour demand causes the wage rate to increase from W_0 to W_1. When in the presence of the new demand, additional labour services are offered in the amount L_0L_1, the opportunity cost of those additional services is measured by their supply price. This is measured (at least in the simplified case) by the shaded area $E_0aL_1L_0$ under the supply curve of labour in the relevant range. Employers who were behaving according to the old demand curve are induced by the rise in wage rate to reduce the quantity of labour they employ from L_0 to L_2. This entails an opportunity cost measured by the value they place on the forgone units L_0L_2, which (in this simplified case) is measured by the area $E_0L_0L_2b$ under the old demand curve.

According to Harberger (1980), in Chart 4-1, where the demand and supply curves are linear in the relevant range, the social opportunity cost associated with the incremental demand L_2L_1 can be expressed as $L_2L_1 \times [(W_0 + W_1)/2]$. Thus, for small increments of demand from any new source, the social opportunity cost equals the price in undistorted situations, since for very small increments of demand, W_0 and W_1 will be close to each other.

In labour markets, the presence of factors like minimum wages, union contracts, and payroll and income taxes have often been viewed as causing distortions. In the presence of such distortions one can no longer simply identify the social opportunity cost with market wages. Chart 4-2 illustrates a case in which labour's earnings are subject to payroll and income taxes. This creates a difference between market wage and the net wage that labour actually receives. Since their take-home pay determines their labour supply, the true labour supply curve is shown by the dotted line. The difference between these two supply curves reflects the payroll and income taxes that have to be paid. In such a case the social opportunity cost of L_2L_1 units of labour services would no longer be measured or approximated by the market wage. The opportunity cost of those additional labour services L_0L_1 is measured by the area cdL_1L_0e under the true supply curve, rather than by the area under the market supply curve. When the additional L_0L_1 units of labour are supplied, employers continue to pay W_0 per unit

Chart 4-1

Social Opportunity Cost in Undistorted Situations



of labour, the taxes are indeed part of this market wage, W_0, and as such are part of their private cost, but they are not part of the social cost of the additional labour services.

According to Harberger (1980), there are two ways to express the social opportunity cost of labour (SOCL) in the presence of the taxes mentioned. One would be as a weighted average of the market wage, W_0, and the net-of-tax wage, W_2, with the weights being the relative shares of L_2L_0 and L_0L_1 in the total distance L_2L_1. This can be expressed as

$$SOCL = \alpha_1 W_0 + \alpha_2 W_2,$$

where

$$\alpha_1 = \frac{L_2L_0}{L_2L_1} \text{ and } \alpha_2 = \frac{L_0L_1}{L_2L_1}.$$

In the second case, the SOCL would simply be the market wage, W_0, adjusted downward to reflect the tax distortion applied on increments of labour supply. This can be expressed as

$$SOCL = W_0 + \alpha_2(W_2 - W_0).$$

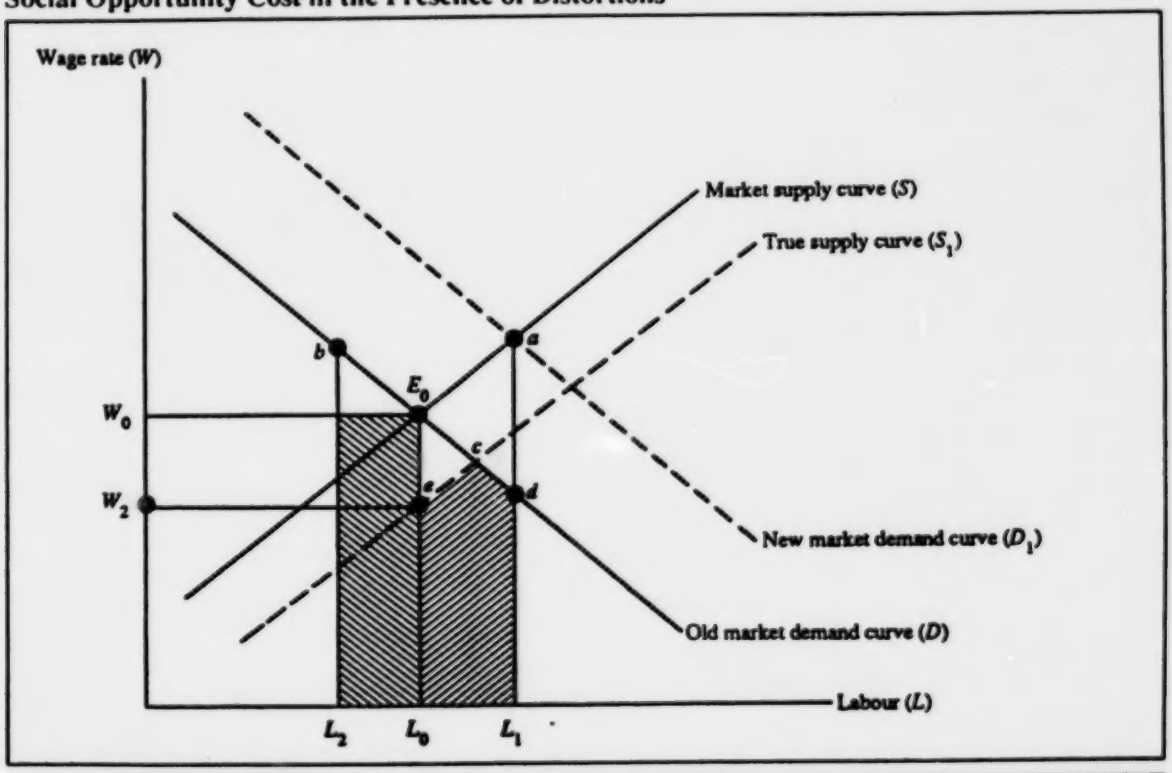
The question with which we are concerned is: In the presence of unemployment, what is the SOCL? The answer will inform policy makers of the cost at which labour must be evaluated in assessing government projects or programs that are designed to increase employment, such as the ETCP.

This case is illustrated in Chart 4-3, where the competitive equilibrium is at E_0, the wage is W_0, and employment is L_0. Let us assume that the minimum wage in this market is set at W_3. This prevents the wage from falling to W_0, and it fixes the wage at W_3, where a new equilibrium will be established at E_3. The supply curve has become W_3xS. At this new wage W_3 there will be L_3 workers who would like to work but only L_4 are employed, leaving initial unemployment at $L_3 - L_4$. The L_4 workers who remain employed benefit by the wage increase. When the subway is built, $L_5 - L_4$ workers are hired, leaving $L_3 - L_5$ workers still unemployed. The budget cost of these incremental employed workers is the new wage W_3 times their quantity $L_5 - L_4$. What is the social cost? In this simplified case, it can be expressed as $L_5 - L_4 \times [(W_5 + W_6)/2]$.[1]

Unfortunately, this static approach of measuring the social opportunity cost of labour is not suitable for our

Chart 4-2

Social Opportunity Cost in the Presence of Distortions



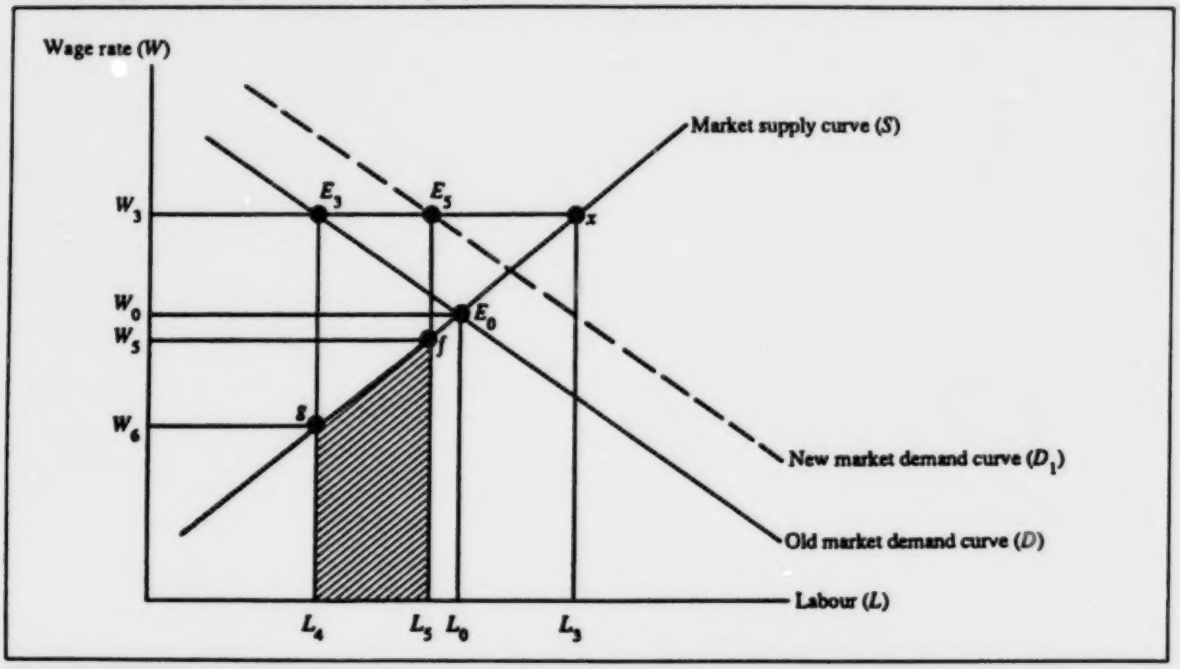
purposes. First, it ignores the interaction between labour markets across and within regions. To determine the social opportunity cost requires a dynamic analysis (EIC, 1981*b*). Second, the output of additional employment may displace some output elsewhere in the economy, and if the resources that would have produced the latter are not re-employed, this forgone output is also a social cost. This suggests that factors like "output displacement" in other sectors of the economy must normally be considered in the calculation of the SOCL. In order to estimate the displacement effects of job creation, a general-equilibrium model of the labour market in question is required (Jenkins and Montmarquette, 1979).

It is sometime argued that if unemployment is high, the SOCL is zero. The report of the Task Force on Labour Market Development in the 1980s (EIC, 1981*b*) pointed out, however, that workers who are not employed permanently often experience alternate spells of employment and unemployment. Thus, in hiring an unemployed worker, one is asking him to forgo the alternative earnings of normal employment and unemployment experiences. Canadians employed in the temporary sector of the economy represent typical examples of workers who are intermittently employed. Clearly, then, the SOCL in such cases is significantly different than zero.

To assess the social opportunity cost of an ETCP job, we set up a general-equilibrium model that is both relatively easy to manipulate analytically and broadly in accord with the realities of the Canadian labour market. The efficiency effects of the ETCP are evaluated in the following manner. The net gain from the ETCP is calculated as the value of the output of labour in the new activity less the social opportunity cost of labour, i.e., the value of the alternatives that workers forgo in accepting new employment. To be consistent with the terminology used by our predecessors, the SOCL will be called the social opportunity cost of a job (SOCJ) created by the ETCP.[2] Thus, the principal questions posed in this study are: What is the SOCJ created by the ETCP in various regions? and Is the SOCJ higher or lower than the value of the output produced by the job? In other

Chart 4-3

Social Opportunity Cost of Unemployed Labour



words, was the job creation brought about by the ETCP socially efficient?

A Framework for Analysis[3]

The Basic Model

Recent studies of unemployment in Canada suggest that an important component of the problem is one of sectoral chronic unemployment supported by unemployment insurance benefits (Harberger, 1980). The data upon which this conclusion is based reveal that a substantial proportion of measured unemployment is concentrated in a relatively narrow subset of industries or activities, all of them characterized by rather sharp seasonality, demand volatility, or high incidence of casual employment. Characteristically, the employment-unemployment experience of individuals in these activities suggests that they experience repeated spells of unemployment with a significant concentration in long spells of unemployment (see, for example, ECC, 1982; EIC, 1981*b*; Glenday and Jenkins, 1981*b*; Hasan and de Broucker, 1985; Robertson, 1986; Beach and Kaliski, 1987). At the same time, the other sectors of the economy appear to generate relatively little unemployment. The individuals working in these sectors are almost never unemployed. The difference between the experience of two sectors dictates that they be treated differently in economic analysis. Harberger describes these two sectors as a temporary sector and a permanent sector.

The basic model that we shall employ can be described as a two-sector model with unemployment. One sector is termed as "permanent" and the other as "temporary." The permanent sector consists of workers who never or rarely experience unemployment. The temporary sector consists of workers who experience unemployment frequently and with great regularity. The temporary sector contains unskilled workers who are either unemployed or employed in jobs that are not expected to provide continuous employment. It is assumed that the presence of a minimum wage causes unemployment in this sector.[4] Temporary sector employment offers a package that consists of net-of-tax wages for the proportion of time employed, net-of-tax UI benefits for the proportion of time unemployed, and the value of leisure time when unemployed. The permanent sector employs skilled workers whose wages are determined by competitive labour market forces. Workers in the temporary sector can acquire skills at their own cost and

move to the permanent sector in response to wage (or utility) differentials. Movement between the sectors is assumed to be an equilibrating phenomenon.[5] Equations B.1 to B.8 in Appendix B describe the basic assumptions and the equilibrium mechanism of the model.

In the presence of taxes and UI benefits, the model produces a long-run equilibrium condition, given by equation 4.1 below, which is derived from the hypothesis that workers in the temporary sector will become skilled and move to the permanent sector, as long as the utility of the skilled labour (net of the cost of acquiring skills) exceeds the expected utility in the temporary sector (that consists of net-of-tax wages for the proportion of time employed, net-of-tax UI benefits for the proportion of time unemployed, and the value of leisure time when unemployed). Clearly, then, in the long-run equilibrium the movement from the temporary to the permanent sector will cease when the expected utility to the (unskilled) worker from both sectors is equalized.

$$W_1 (1 - t_1) - C = \Pi \overline{W}_2 (1 - t_2) + (1 - \Pi) h + (1 - \Pi) \cdot b \cdot d (1 - t_2), \quad (4.1)$$

where

$\overline{W}_1$ = the weekly pretax gross wage in the permanent sector;
t_1 = the average personal income tax rate on income W_1;
C = the weekly cost of acquiring skills borne privately;
$\overline{W}_2$ = the fixed weekly pretax gross wage in the temporary sector;
Π = the probability of employment in the temporary sector;
$(1 - \Pi)$ = the probability of unemployment in the temporary sector;
h = the value of nonmarket or leisure time when unemployed;
b = the unemployment insurance benefit rate;
d = the proportion of time while unemployed that an unskilled worker expects to collect UI benefits; and
t_2 = the average personal income tax rate on income $\overline{W}_2$.

The Social Opportunity Cost of a Job in the Presence of Taxes and UI Benefits

Suppose one more worker is to be hired in this temporary sector at the fixed wage $\overline{W}_2$. The social opportunity cost of hiring a worker in the temporary sector to fill a newly created job is the cost of achieving the output created by that job. This will include changes in the imputed value of nonmarket time and any skill-acquiring costs from not hiring an additional worker in the permanent sector due to the contraction of that sector. Note that in our analysis labour is the only variable factor. Therefore, the SOCJ is the cost of labour for creating an additional job.

To derive an expression for the SOCJ, we use the methodology that involves determining the change in societal welfare from creating a job in the temporary sector. The general expression for a change in social welfare (dz) from any comparative static change in our model is[6]

$$dz = dX_1 + dX_2 + h\,(dL_2 - dN_2) + C \cdot dL_2, \quad (4.2)$$

where

dz = the change in social welfare;
dX_1 = the change in output in the permanent sector valued at unit prices;
dX_2 = the change in output in the temporary sector valued at unit prices;
$h\,(dL_2 - dN_2)$ = the change in unemployment in the temporary sector and, hence, changes in leisure valued at h; and
$C \cdot dL_2$ = the change in movement from the temporary to the permanent sector costed at C.

Since UI benefits are simply a transfer they do not appear in equation 4.2. Consider now the change in societal welfare due to job creation in the temporary sector. Note that we do not consider here explicitly the change in societal welfare due to an employment subsidy in the temporary sector. Our interest here is to derive an expression for the social opportunity cost of a job created by the employment subsidy program in the temporary sector. It is assumed here that an employment subsidy policy is chosen for the purpose of creating a targeted number of jobs in the temporary sector. The expression for the change in societal welfare resulting from job creation in the temporary sector can be derived from equation 4.2 by holding total labour endowment $\overline{L}$ constant. Thus,

$$\left.\frac{dz}{dN_2}\right|_{\overline{L}} = \frac{dX_1}{dN_2} + \frac{dX_2}{dN_2} + h\left(\frac{dL_2}{dN_2} - 1\right) + C\,\frac{dL_2}{dN_2}. \quad (4.3)$$

Alternatively, equation 4.3 can be written as

$$\left.\frac{dz}{dN_2}\right|_{\bar{L}} = \frac{dX_2}{dN_2} - \frac{dX_1}{dL_1} \cdot \frac{dL_2}{dN_2} + h\frac{dL_2}{dN_2} - h + C\frac{dL_2}{dN_2}.$$

From equations B.1 and B.2 in Appendix B, substituting for dX_1/dL_1 and dX_2/dN_2, we get

$$\left.\frac{dz}{dN_2}\right|_{\bar{L}} = f_2' - h - (f_1' - h - C)\frac{dL_2}{dN_2}. \quad (4.4)$$

The social cost of achieving the value of output produced by the new job, f_2', is then given by

$$SOCJ = h + (f_1' - h - C)\frac{dL_2}{dN_2}. \quad (4.5)$$

The interpretation of equation 4.5 is straightforward. Job creation leads to additional employment (and output) in the temporary sector and to a decrease of employment (and output) in the permanent sector. The labour cost of creating an additional job is then given by the value of the leisure lost by workers producing more output in the temporary sector plus the value of the return forgone by those workers by not moving to the labour-losing sector $(f_1' - h - C)$, multiplied by the shift of labour that occurs per unit of job creation (dL_2/dN_2). If the new job creation simply reduces the pool of the unemployed in the temporary sector and does not displace any other employment in the permanent sector [that is, $(f_1' - h - C)(dL_2/dN_2) = 0$], then the SOCJ is simply the value of leisure to the unemployed.

Since $dL_2/dN_2 = -dL_1/dN_2$, equation 4.5 can be rewritten as

$$SOCJ = h - (f_1' - h - C)\frac{dL_1}{dN_2}. \quad (4.6)$$

An expression for dL_1/dN_2 can be derived from the long-run equilibrium condition of our model given by equation 4.1, which can be rewritten as

$$f_1'(1-t_1) \cdot L_2 - C \cdot L_2 = N_2 f_2'(1-t_2) + (L_2 - N_2)h + (L_2 - N_2)b \cdot d(1-t_2), \quad (4.7)$$

where f_2' is the marginal product of unskilled labour in the temporary sector; f_1' is the marginal product of skilled labour in the permanent sector; and L_2 is the unskilled labour force in the temporary sector.

Totally differentiating equation 4.7, assuming $dC = df_2' = 0$, and substituting and rearranging yields

$$\frac{dL_1}{dN_2} = -\frac{[f_2'(1-t_2) - b \cdot d(1-t_2) - h]}{\{\Pi[f_2'(1-t_2) - b \cdot d(1-t_2) - h] - f_1''(1-t_1)L_2\}}. \quad (4.8)$$

Substituting equation 4.8 into equation 4.6, we get

$$SOCJ = h + (f_1' - h - C) \quad (4.9)$$

$$\frac{[f_2'(1-t_2) - b \cdot d(1-t_2) - h]}{\{\Pi[f_2'(1-t_2) - b \cdot d(1-t_2) - h] - f_1''(1-t_1)L_2\}}.$$

Substituting equation 4.9 back into equation 4.4, we get

$$\left.\frac{dz}{dN_2}\right|_{\bar{L}} = f_2' - \left[h + (f_1' - h - C)\right. \quad (4.10)$$

$$\left.\frac{[f_2'(1-t_2) - b \cdot d(1-t_2) - h]}{\{\Pi[f_2'(1-t_2) - b \cdot d(1-t_2) - h] - f_1''(1-t_1)L_2\}}\right].$$

Theoretically it is difficult to predict whether the SOCJ is greater or less than, or equal to, the wage rate – in other words, $dz/dN_2 \gtrless 0$. The rest of this study is devoted to answer this question empirically.

Estimating the Social Opportunity Cost of a Job Created by the ETCP

To measure the SOCJ, we need to estimate a set of components. These components include:

- The probability of finding alternative employment for ETCP workers (Π);
- The proportion of time an ETCP worker is expected to receive UI benefits when unemployed (d);
- The value of leisure time when unemployed, in the presence of the cost of acquiring skills (h);
- Wages in the permanent sector (W_1); the average tax rates in both sectors (t_1 and t_2); the cost of acquiring skills (C); the UI benefit rate (b); the size of the temporary sector (L_2); the number of temporary sector workers employed (N_2); and the slope of the labour demand curve in the permanent sector (f_1'').

To estimate these elements, we use the linked longitudinal Labour Force Data Base (LFDB) maintained by Em-

ployment and Immigration Canada. The LFDB contains micro-historical data on the labour market experience of a 10 per cent sample of all "insured" workers.[7] A sample of 2,359 ETCP participants, who joined the program at some point during its first 21 months (i.e., from April 1978 to December 1979) and who had at least one episode of employment during the period from 1975 to the ETCP joining date, was drawn from the LFDB.[8] Using the administrative records of the Unemployment Insurance Commission and the Records of Employment, a week-by-week labour force activity profile for each ETCP worker, showing the employment, unemployment, and out-of-the-labour-force status, is established. The weekly profiles are then converted into employment, unemployment, and out-of-the-labour-force spells.[9] Based on this information, we are able to estimate the probability of finding alternative employment and the length of unemployed time during which ETCP workers are expected to collect UI benefits.

Estimating the Probability of Finding Alternative Employment (Π)

To estimate the probability that ETCP workers will find employment, we calculate the proportion of labour force time ETCP workers were employed during the period from January 1975 to the ETCP joining date. Hence, for each ETCP participant in our sample, we construct an employment index as follows:

> Π = (Total number of weeks the participant was employed during the years from 1975 to the program joining date)/(Total number of weeks in the labour force during that period).

This Π may be interpreted as the individual's employment rate or the probability of finding employment in the temporary sector (or the proportion of time that he(she) will be employed). The probability of finding employment (Π) is expected to depend on several variables describing the characteristics of the individuals, previous jobs, and labour market conditions.

$$\Pi = f(X, M), \tag{4.11}$$

where X is a vector of variables which contains a set of demographic and productivity characteristics for each individual; and M captures the labour market conditions.

The dependent variable in equation 4.11 is a fraction varying between 0 and 1. If equation 4.11 is written as a linear function, the population regression model is

$$Y_i = E(Y_i) + \varepsilon_i = \Pi_i + \varepsilon_i = X_i'\beta + \varepsilon_i, \tag{4.12}$$

where the probability Π_i in equation 4.12 is the expectation of Y conditional on the values of independent variables; the vector β contains the parameters to be estimated; and X_i represents the factors included in the equation influencing the probability of employment of individual i.

As Goldberger (1964) and others have noted, equation 4.12 does not constrain Π_i to lie between 0 and 1. It is also characterized by heteroscedastic residuals.

An alternative which constrains Π_i to lie between 0 and 1 is to write equation 4.12 as a logistic function (Goldberger, 1964, p. 249; Amemiya, 1981).

$$\Pi_i = \frac{e^{X_i'\beta}}{1 + e^{X_i'\beta}}. \tag{4.13}$$

Equation 4.13 can be written in the "log odds ratio" form

$$ln\left(\frac{\Pi_i}{1-\Pi_i}\right) = X_i'\beta. \tag{4.14}$$

Equation 4.14 implies that β can be interpreted as the derivative of the logarithm of the odds in favour of employment of individual i. This equation is used in the empirical analysis.

As Amemiya and Nold (1975) have pointed out, the standard logit model (equation 4.14) should be modified to include an equation error, which can be interpreted as a surrogate for omitted variables. An additional issue discussed in Berkson (1951, 1953) is that since frequencies are used in constructing the log odds ratio, the logit equation will have heteroscedastic residuals. If these frequencies are based on independent samples from binomial populations, the estimator of the true log odds ratio will have an asymptotic variance which is approximately equal to ω_i, defined as $\omega_i = \sigma^2 + [N_i\Pi_i(1-\Pi_i)]^{-1}$, where σ^2 is the variance of the equation error and N_i is the number of total weeks in the labour force (Amemiya and Nold, 1975; Berkson, 1951 and 1953; Theil, 1970). The variance σ^2 can be estimated consistently as

$$s^2 = \left(\frac{1}{T}\right)\left\{\Sigma_i (p_i - X_i'b)^2 - \Sigma_i\left[\frac{1}{N_i\Pi_i(1-\Pi_i)}\right]\right\},$$

where T is the number of observations ($i = 1, \ldots, T$); p_i is the log odds ratio; and b is a vector of logistic parameters estimated by ordinary least squares (OLS).

In an effort to obtain efficient parameter estimates and consistent standard errors, the logistic model was fitted by weighted least squares (WLS). The value of $(\omega)^{-1/2}$ used to

multiply each variable prior to least squares estimation was calculated with N_i equal to the total number of weeks an individual spent in the labour force. The value of ω_i is given by

$$\omega_i = s^2 + \frac{1}{N_i \Pi_i (1 - \Pi_i)}.$$

Alternatively, we can write

$$\omega_i = \left(\frac{1}{T}\right)\left\{\Sigma_i (p_i - X_i' b)^2 - \Sigma_i \left[\frac{1}{N_i \Pi_i (1 - \Pi_i)}\right]\right\} + \frac{1}{N_i \Pi_i (1 - \Pi_i)}. \quad (4.15)$$

Table 4-1

Determinants of the Probability of Finding Alternative Employment for ETCP Participants, 1975 until the Program Joining Date*

Dependent variable: *ln* (Π/1 – Π)

	OLS estimates	WLS estimates
	(*t*-statistics)	
Coefficients of:		
Intercept	1.697	1.817
	(9.00)	(8.96)
Sex	0.301	0.309
	(5.16)	(5.22)
Age	0.050	0.043
	(4.11)	(3.57)
$(Age)^2$	–0.0006	–0.0005
	(3.36)	(2.89)
Urate	–0.214	–0.216
	(17.11)	(17.53)
R^2	0.41	0.41
F-ratio	67.55	50.14
Number of observations	2,317	2,317
Mean of the dependent variable (unweighted)	1.136	1.136

* The estimation results for other variables (such as occupation, industry, province) are not presented in this table but are available from the author on request.

Table 4-2

Mean Estimated Probability of Finding Alternative Employment for ETCP Workers, by Province, 1979

	Mean estimated probability[1]
Newfoundland	0.51
Prince Edward Island	0.58
Nova Scotia	0.52
New Brunswick	0.63
Quebec	0.64
Ontario	0.71
Manitoba	0.73
Saskatchewan	0.75
Alberta	0.74
British Columbia	0.74

1 Based on the estimated coefficients from the logit regressions and the mean values of independent variables for those individuals who joined the ETCP in 1979.

The WLS and OLS logit estimates of β are presented in Table 4-1.

The overall explanatory power of the equation is good, as R^2 is equal to 0.41, and the *F*-statistic is 67.55 (significant at the 99 per cent confidence level). These findings suggest, in general, that the socioeconomic characteristics of the ETCP participants are important determinants of their employment (unemployment) behaviour. Finally, the OLS results in Table 4-1 are nearly identical to those obtained using WLS.

The estimated coefficients from the WLS regression and the mean values for the whole sample of independent variables (other than provinces) can be plugged into the logistic function, given by equation 4.14, to provide estimates of the average probability of finding alternative employment, by province. In adjusting the mean probability of employment (Π) to changing aggregate economic conditions, we use the average national unemployment rate (*Urate*) for the year 1979. Table 4-2 presents the estimates of the probability of finding alternative employment, by province, for ETCP workers in the year 1979.

The results indicate that the proportion of time the ETCP workers would have spent unemployed in the absence of the program is consistent with the observed provincial unemployment rates. It is estimated that ETCP workers in Newfoundland on average would have spent 51 per cent of their labour force time in alternative jobs had the program not existed. In Alberta, where unemployment was low in the year under consideration, participants would have spent an

average of 74 per cent of their time in alternative employment in the absence of the program.

Estimating the Proportion of Time a Person Expects to Receive UI Benefits while Unemployed (d)

To estimate the proportion of time an ETCP participant expects to receive UI benefits while unemployed (d), we calculate the proportion of time ETCP workers received UI benefits during the period from 1975 to the ETCP joining date. For each of the 2,359 participants in our sample, we construct a UI index as follows:

d = (Total number of weeks ETCP participants received UI benefits during the period from 1975 to the program joining date)/(Total number of weeks unemployed during that period).

Several independent variables which describe the characteristics of the individuals, jobs, UI benefits, and the labour market conditions are used to estimate d. The general functional form of the model used for estimation is

$$d = g(X, M, WB, \Pi), \tag{4.16}$$

where X, M, and Π have been defined earlier; and WB is the weekly replacement ratio defined as the ratio of average weekly UI benefits to the average weekly wage.

In Table 4-3 we report a statistical analysis of the influence of these factors using the logistic function

$$d_i = \frac{e^{X_i'\beta}}{1 + e^{X_i'\beta}}. \tag{4.17}$$

Equation 4.17 can be expressed in the "log odds ratio" form

$$ln\left(\frac{d_i}{1-d_i}\right) = X_i'\beta. \tag{4.18}$$

Table 4-4 presents the estimates of the mean proportion of unemployed time, by province, during which the ETCP

Table 4-3

Determinants of the Proportion of Unemployment Time during which ETCP Participants Expect to Receive UI Benefits (d), 1975 until the Program Joining Date*

Dependent variable: $ln\ (d/1-d)$

	OLS estimates	WLS estimates
		(t-statistics)
Coefficients of:		
Intercept	–0.167	–0.123
	(1.20)	(0.81)
Sex	–0.095	–0.129
	(2.26)	(2.87)
Age	0.018	0.020
	(2.12)	(2.28)
$(Age)^2$	–0.0002	–0.0002
	(1.35)	(1.31)
Urate	0.184	0.167
	(13.95)	(12.63)
WB	0.0009	0.0001
	(1.06)	(0.12)
Π	–0.002	–0.002
	(2.83)	(2.60)
R^2	0.49	0.40
F-ratio	65.63	44.69
Number of observations	2,287	2,287
Mean of the dependent variable (unweighted)	1.155	1.155

* The estimation results for other variables (such as occupation, industry, province) are not presented in this table but are available from the author on request.

Table 4-4

Mean Estimated Proportion of Unemployed Time during which ETCP Workers Expect to Receive UI Benefits (d), by Province, 1979

	Mean estimated proportion of time[1]
Newfoundland	0.87
Prince Edward Island	0.82
Nova Scotia	0.86
New Brunswick	0.87
Quebec	0.85
Ontario	0.81
Manitoba	0.80
Saskatchewan	0.80
Alberta	0.81
British Columbia	0.81

1 Based on the estimated coefficients from the logit regressions and the mean values of independent variables for those individuals who joined the ETCP in 1979.

participants expected to receive UI benefits for the year 1979. These are obtained by using the estimated coefficients from the WLS regression and the mean values of the independent variables (other than provinces) and the logistic function (equation 4.17).

The results suggest that the proportion of time during which ETCP workers would expect to receive UI benefits while unemployed does not differ markedly across provinces. The results indicate that the proportion of unemployed time during which ETCP workers expect to receive UI benefits varies between 80 per cent (for Manitoba and Saskatchewan) and 87 per cent (for Newfoundland and New Brunswick).

Estimating the Value of Nonmarket or Leisure Time while Unemployed in the Presence of the Cost of Acquiring Skills

We calculate the value of nonmarket or leisure time when unemployed for ETCP participants in our sample from equation 4.1. The expression for calculating h is given by

$$h = \frac{1}{1-\Pi}\{W_1(1-t_1) - C - [\Pi \overline{W}_2 + (1-\Pi)b \cdot d](1-t_2)\}. \quad (4.19)$$

The calculation of this essentially involves estimating Π and d, which have been estimated earlier; determining the weekly wage rate in the temporary sector; determining the weekly cost of acquiring skills; determining the weekly wage rate in the permanent sector; determining the values of tax parameters, t_1 and t_2; and determining the weekly UI benefit rate (b).

The Weekly Wage Rate in the Temporary Sector ($\overline{W}_2$)

The weekly wage earned in alternative jobs in the temporary sector ($\overline{W}_2$) is assumed to be the same as that given by the ETCP weekly wage. To the best of our knowledge, the latter wage is not significantly different from the former in the corresponding province. The ETCP weekly wage for the individuals in our sample is obtained from T-4 data on UI insurable earnings.[10] The average ETCP weekly wage for the year 1979 by province is reported in Table 4-5. The 1979 ETCP weekly wage is higher for British Columbia ($207.22) and Alberta ($198.20), and lower for Manitoba ($158.79) and the Atlantic provinces (ranging from $152.80 to $160.78), except for New Brunswick ($171.03). The ETCP wage in Quebec and Ontario was slightly higher than that in Saskatchewan ($173.95).

Table 4-5

Mean ETCP Weekly Wage, by Province ($\overline{W}_2$), 1979

	Average ETCP weekly wage
	(1979 $)
Newfoundland	152.80
Prince Edward Island	160.78
Nova Scotia	158.47
New Brunswick	171.03
Quebec	182.41
Ontario	176.57
Manitoba	158.79
Saskatchewan	173.95
Alberta	198.20
British Columbia	207.22

Source: Employment and Immigration Canada, sample ETCP file linked with the LFDB, 1975 to 1978/79.

The Cost of Acquiring Skills (C)

In equation 4.19, C represents the cost of acquiring skills (borne by workers). Broadly defined, C represents investment in the acquisition of skills or in the improvement of worker productivity and is reflected by a wage differential between skilled and unskilled labour. Unfortunately, data on skill acquisition costs are scarce in Canada. However, some scanty evidence exists on the cost of employer-based training. We make use of this information to assign a value to C in our model. To do so, we assume that workers buy training services from the firm. If an employer sells his(her) "product" (i.e., training services), he(she) would presumably charge workers on the basis of the costing procedure after adding a markup for risk and profit. According to Becker (1964), under competitive conditions, all of the firm's costs will be charged to the worker if the training increases his(her) future productivity in other firms just as much as in the firm in which he(she) is training. Some fraction of costs will not be charged to the worker if the training contains elements of specificity, that is, if it increases the worker's future productivity in the training firm more than in other firms.

The cost of training consists of personnel costs and payment to personnel (all wage payments, bonuses, commissions), other personnel costs (UI benefits, pension, allowances), fees paid for external training, building costs and services, production costs, administrative costs, transportation expenses, and costs for materials and tools. We

assume that all these direct and indirect costs of training are charged to the worker since he(she) buys training services from the firm. Although various basic and often controversial issues are involved in calculating the cost of training, Currie, Coopers and Lybrand Ltd. (1978) has calculated the total net operating costs per apprentice machinist over four years in Ontario. Based on instructor wage costs, the net operating cost per trainee is $31,356 over four years (Table 4-6).

Schuyff (1980) has also estimated the cost of training an apprentice in various occupational categories in British Columbia. The estimates show the total cost to be highest for an industrial instrumentation mechanic at around $55,000 and lowest for a hotel cook at about $6,300 (Table 4-7).

To calculate the value of C on a weekly basis, we first consider the Ontario study for machinists which shows $31,356 as the cost of training over four years. To convert this figure to a weekly flow basis, it is assumed that the trainee borrows $31,356 either from the capital market or from the employers (i.e., the sellers of training) and pays back the total amount of the loan over 15 years at a 10 per cent nominal rate of interest compounded annually. We assume 15 years to be a reasonable period for repaying the loan. With these assumptions, the worker would pay $79.60 per week or $4,139.20 per year for 15 years at a 10 per cent compounded annual rate of interest r.[11] Thus the value of C equals $79.60 per week. Another way to look at the problem is that the trainee accepts a lower wage by an amount of $79.60 per week for 15 years after he(she) has acquired skills.

Table 4-6

Total Net Operating Costs per Apprentice Machinist over a Four-Year Period, Based on Instructor Wage Costs, Ontario

	Incorporating instructor wage costs
	($)
Trainee wages	55,859
Instructor wages	14,115
Gross direct costs	69,974
Less apprentice productivity	55,076
Direct wage costs	14,898
Net operating costs[1]	31,356

1 The direct wage costs, less subsidies, plus overhead, equal the net operating costs. Overhead consists of 18 separate items. The net operating costs per apprentice per period were calculated for each company. When these are averaged, with weighting according to strata, the overall net operating costs are obtained.

Source Currie, Coopers and Lybrand Ltd. (1978).

Table 4-7

Estimated Cost Range of Training an Apprentice in Selected Trades over a Four-Year Period, British Columbia

	Total cost
	($)
Plumber (construction)	25,126
Plumber (long-term maintenance)	31,097
Machinist (metal)	33,421
Cook (B.C. hotels)	6,301
Horticulturalist (landscaper)	22,290
Horticulturalist (BCBC)	24,971
Graphic arts (engraver-newspaper)	38,074
Partsman	19,217
Industrial instrumentation mechanic (metal)	54,948

Source Schuyff (1980).

The British Columbia study estimated the cost of training an apprentice machinist to be $33,421 over four years. Following the procedure described just above, the value of C on a weekly flow basis comes to $84.84 per week or $4,411.68 per year.

In applying the value of C in our calculations, we assume that the weekly value of C, calculated on the basis of the Ontario study, is applicable to that province, Quebec, and the Atlantic provinces. Further, we assume that the weekly value of C, based on the British Columbia cost calculations, is applicable to that province and the other western provinces.[12]

The Weekly Wage Rate in the Permanent Sector (W_1)

The variable W_1 in equation 4.19 denotes the competitive wage in the permanent sector. To assign a value to it, we look at the wage for machinists in the nonunionized skilled sector, by province, for the year 1979 (Table 4-8). This is because our estimate of C pertains to the cost of training for machinists.

One point that needs to be clarified at this stage is why we look at the wage in the nonunionized skilled sector and not in the unionized sector. The reason is that the probability of employment in the unionized skilled sector may not be equal to one. If unionized employees receive a higher wage than do nonunionized employees, one would expect average variable costs to be higher (absent productivity differences between the two sets of workers). Therefore the unionized firm is more likely to shut down in a period of reduced demand than is the nonunionized firm, i.e., layoffs

Table 4-8

Hourly Wage Rate and Weekly Wage for Machinists in the Nonunionized Skilled Sector, by Province, 1979

	Wage rate	Weekly wage
	($ per hour)	($)
Newfoundland	6.26	235.37
Prince Edward Island[1]	–	–
Nova Scotia	6.97	226.95
New Brunswick	6.42	249.10
Quebec	7.45	289.80
Ontario	7.96	303.62
Manitoba	7.41	276.39
Saskatchewan	7.92	193.04
Alberta	9.55	341.10
British Columbia	9.70	352.11

1 Data not available.
Source Based on Labour Canada (1979).

are more likely. Based on the U.S. experience, Medoff (1979) found that adjustment through layoffs is substantially greater in unionized firms than in comparable nonunionized firms.[13]

Tax Parameters, t_1 and t_2

The vast majority of workers in the ETCP were under 24 years of age and 73 per cent had no dependents. Therefore, in estimating the average tax rate of these workers it is assumed that none had dependents. Given their wages and family situation, the average rate of income tax applicable to these workers in the temporary sector (t_2) is assumed to be approximately 12 per cent for the year 1979. The values of t_1 for the same period are assumed to be approximately 20 per cent on weekly wage rates less than $300, and 25 per cent on weekly wage rates of $300 and more.

The Unemployment Insurance Benefit Rate (b)

Finally, the value of b, the weekly benefit rate, is assumed to be 60 per cent of the claimants' average weekly insurable earnings (i.e., $b = 0.6\bar{W}_2$). Under the current UI program, the rate of weekly benefit payable equals 60 per cent of the claimants' average weekly insurable earnings during the last 20 weeks of their qualifying period. For claimants with fewer than 20 weeks insurable employment, the rate of benefit is 60 per cent of their average insurable earnings during all the weeks of insurable employment (EIC, 1981*a*, p. 58).

When the values of all these variables/parameters are plugged into equation 4.19, we obtain the weekly values of nonmarket or leisure time (h) while unemployed for ETCP workers for the year 1979. The values are shown in Table 4-9. We find that the value of nonmarket or leisure time that workers enjoy is not independent of the amount of time that they spend working. The estimated average weekly value of leisure time for an unskilled worker varies across provinces within a range of 5 to 39 per cent of the weekly ETCP wage rates, and it is inversely related to the provincial unemployment rate (Charts 4-4 and 4-5). The value as a percentage of the weekly wage is lower for workers residing in New Brunswick (5 per cent) and Newfoundland (8 per cent) and higher for those in the western provinces (39 per cent in British Columbia and Alberta, 38 per cent in Saskatchewan and Manitoba). This value is 31 per cent in Quebec and Ontario. The low value of leisure in high-unemployment provinces has been used elsewhere as an important argument for taking jobs to the depressed regions (Sugden and Williams, 1978, pp. 99-112).

Notice that the estimates of the value of nonmarket time when unemployed (h) may be biased to the extent that the values of C we used in our calculations are over- or underrepresented.[14]

Specification of Other Variables Required to Estimate the SOCJ

In order to estimate the social opportunity cost of an ETCP job in the year 1979, in accordance with equation 4.9, we still need information regarding the size of the tempo-

Table 4-9

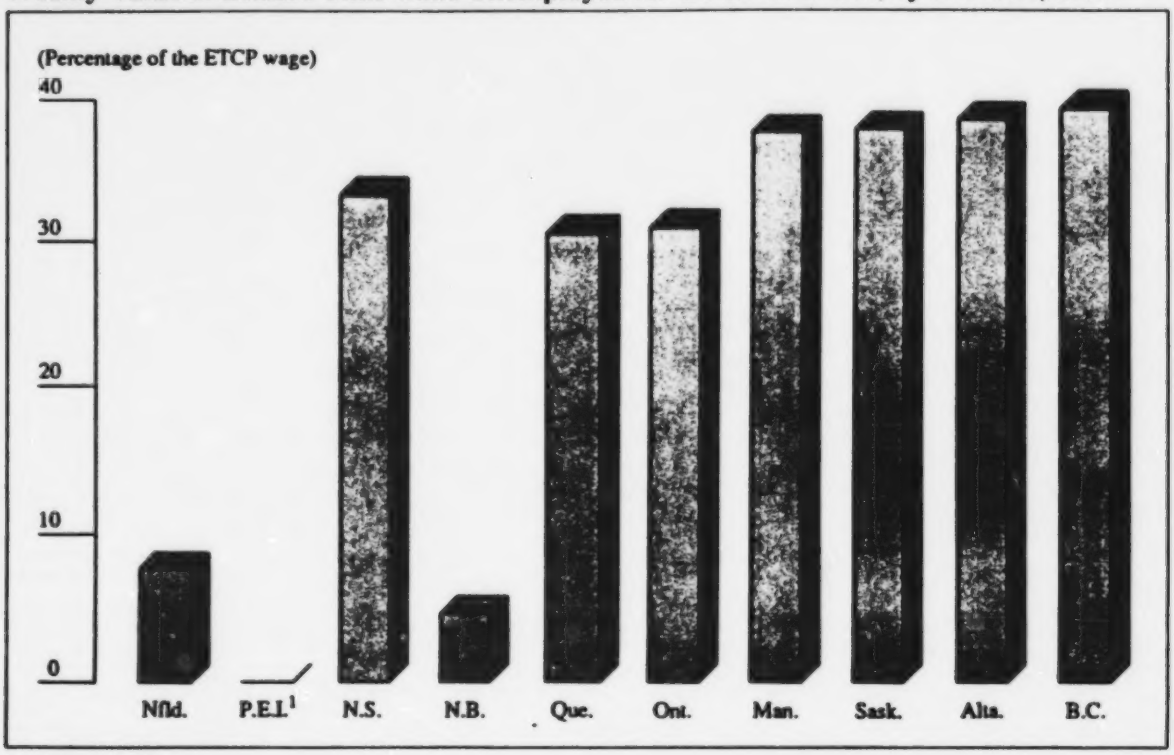
Weekly Value of Leisure Time (h) while Unemployed for ETCP Workers, by Province, 1979

	Value of h per week	Value of h as a proportion of ETCP pretax (gross) wage
	(1979 $)	(Per cent)
Newfoundland	11.69	7.65
Prince Edward Island[1]	–	–
Nova Scotia	52.65	33.23
New Brunswick	7.73	4.52
Quebec	55.67	30.52
Ontario	54.83	31.05
Manitoba	59.85	37.70
Saskatchewan	65.64	37.73
Alberta	76.46	38.58
British Columbia	81.77	39.46

1 Data not available.
Source Estimates by the author.

Chart 4-4

Weekly Value of Leisure Time while Unemployed for ETCP Workers, by Province, 1979



1 Data not available.

rary sector (L_2); total employment in the temporary sector (N_2); and the slope of the labour demand curve in the permanent sector (i.e., f_1'').

To determine the size of the labour force in the temporary sector, we draw upon the work done by Glenday and Jenkins (1981*a*). In their work, they set out two related rules to segment the Canadian labour force into temporary and permanent sectors.

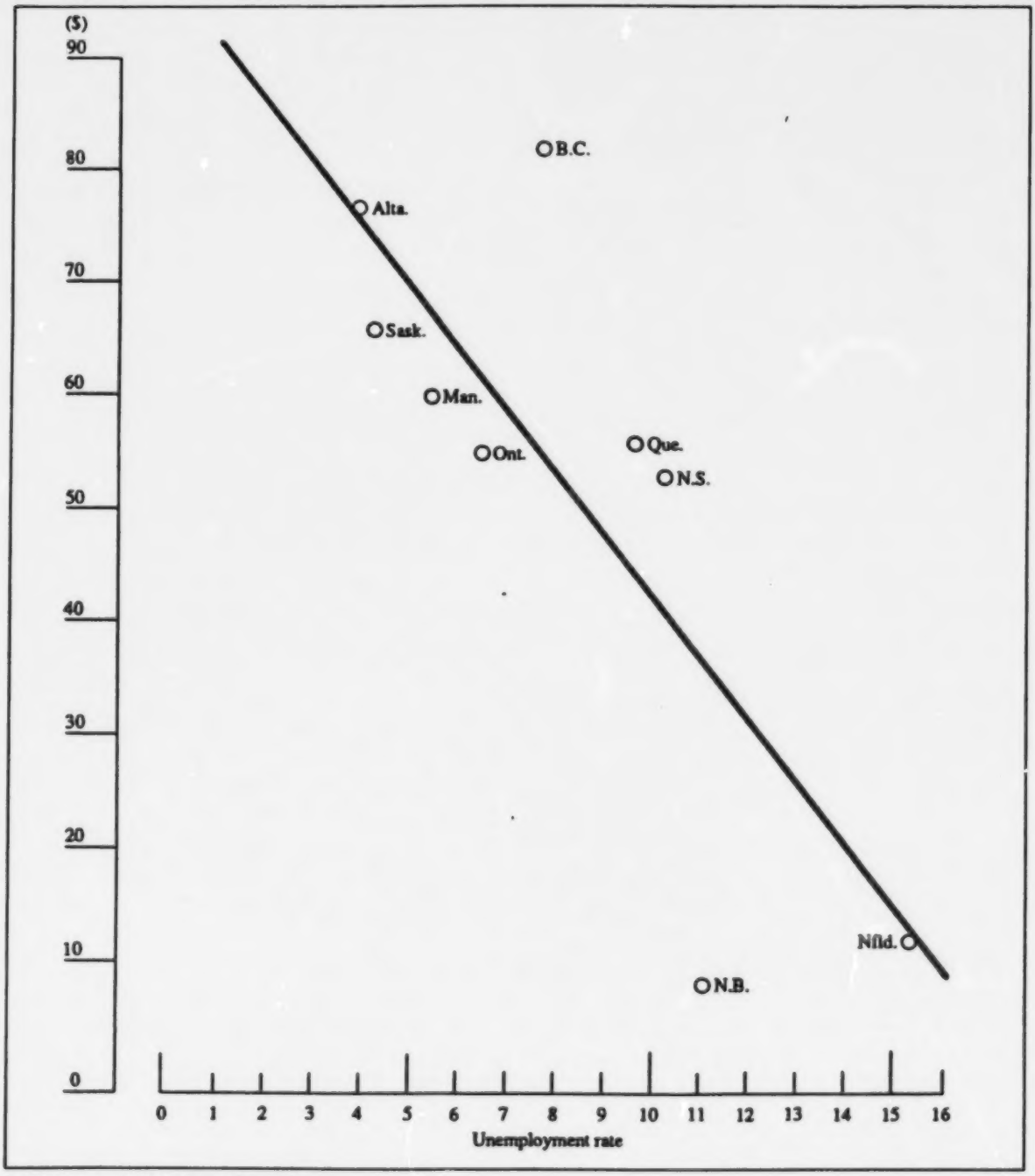
They define as temporary sector A those workers who experience an unemployment spell of four weeks or more in duration *at least* once every four years. Temporary sector B is a broader classification. It includes all those workers who experience an unemployment spell of one week or more in duration *at least* once every four years. Under these criteria, temporary sector A workers will be a subset of temporary sector B. All workers not in the temporary sector are classified as being part of the permanent sector of the Canadian labour force.

Using the LFDB data set for 1972 to 1979, they classified members of the Canadian labour force according to these criteria and related the temporary sector to the actual size and composition of the Canadian labour force in 1979. Under the more restrictive definition (type A), they find that 24 per cent of the Canadian labour force is of this type. Temporary sector B workers make up 36 per cent of the total Canadian labour force.

As between regions, they find that the size of the temporary sector A ranges from 16 per cent of the total labour force in Oshawa and Edmonton to a high of 46 per cent of the labour force in Newfoundland and the northeast of New Brunswick. Likewise, the size of the temporary sector B ranges from 27 per cent of the labour force in Edmonton to 58 per cent of the labour force in Newfoundland. If a comparison is drawn between the relative sizes of the temporary sectors in the traditional slow-growth regions and the normal labour market regions, then it is found that under both classifications the relative size of the temporary sector is about 15 percentage points higher on average in the former as compared with the latter regions, or approximately 70 per cent larger by criterion A and 40 per cent larger by B.

Chart 4-5

Weekly Value of Leisure Time while Unemployed for ETCP Workers and Unemployment Rate, by Province,[1] 1979



1 Data not available for Prince Edward Island.

Based on their results we present in Table 4-10 (column 1) the proportion of all workers in the labour force who could be classified in the temporary sector. These numbers are based on the temporary sector A criteria. If we were to adopt a broader definition of the temporary sector (i.e., the B criteria), the percentage would increase somewhat. Column 2 of this table shows the total Canadian labour force in 1979. Column 3 shows the temporary sector labour force under the A criteria (L_2). Since we have already estimated the proportion of labour force time these individuals are employed (Π), by province (see Table 4-2), multiplying this factor with the temporary sector labour force (column 3) yields the total number of employed workers in the temporary sector (N_2). The values are shown in column 5 of Table 4-10.

The next step is to estimate the value of f_1^m. This value is derived from the following expression:

$$\varepsilon = \frac{dL_1}{dW_1} \cdot \frac{W_1}{L_1}. \tag{4.20}$$

where ε is the long-run wage elasticity of employment or the elasticity of demand for labour in the permanent sector. From equation 4.20, we can derive the value of dW_1/dL_1 which is given by

$$f_1^m = \frac{dW_1}{dL_1} = \frac{W_1}{\varepsilon L_1}. \tag{4.21}$$

where W_1 is the wage rate and L_1 represents total employment in the permanent sector. To estimate ε, a labour demand equation is estimated which is identical to the one in the RDXF model of the Bank of Canada. The equation is estimated for the private nonfarm sector of the Canadian economy, for the first quarter of 1962 through the first quarter of 1979.

The estimates indicate that the short-run (one-year) elasticity of labour demand with respect to change in wages, holding output and capital stock constant, is –0.17. Although there is not much Canadian evidence on this issue, the estimated value is in broad conformity with the estimates derived from studies conducted in the United States. In a short survey of the U.S. results, Hamermesh (1976) suggests that the likeliest short-run (one-year) employment-wage elasticity is –0.15, holding output and price of capital constant. The estimate of the average long-run wage elasticity of employment is –0.373.[15]

The f_1^m is calculated as[16]

$$f_1^m = -\frac{W_1}{0.373\, L_1}. \tag{4.22}$$

The estimates of f_1^m, by province, are presented in Table 4-10 (column 6). Those values range from 0.0002 (for Ontario) to 0.0059 (for Newfoundland).

Estimating the Social Opportunity Cost of an ETCP Job

Based on the information specified earlier in this chapter, we are now in a position to estimate the SOCJ (equation 4.9)

Table 4-10

Estimates of Other Variables, by Province, 1979

	Proportion of labour force in the temporary sector (1)	Total labour force (2)	Total labour force in the temporary sector (L_2) (3)	Proportion of time employed in the temporary sector (Π) (4)	Employed labour force in the temporary sector (N_2) (5)	Slope of the labour demand curve in the permanent sector (f_1^m) (6)
	(Per cent)	(Thousands)		(Per cent)	(Thousands)	
Newfoundland	0.46	207	101.43	0.51	51.73	–0.0059
Prince Edward Island	0.35	53	18.55	0.58	10.76	–
Nova Scotia	0.33	352	116.16	0.52	73.18	–0.003
New Brunswick	0.35	280	98.00	0.63	50.96	–0.0036
Quebec	0.26	2,878	748.28	0.64	478.90	–0.0003
Ontario	0.22	4,289	943.58	0.71	669.94	–0.0002
Manitoba	0.17	478	81.26	0.73	59.32	–0.0018
Saskatchewan	0.18	433	77.94	0.75	58.46	–0.0022
Alberta	0.17	1,015	172.55	0.74	127.69	–0.001
British Columbia	0.32	1,223	391.36	0.74	289.61	–0.0011

Source: Based on Glenday and Jenkins (1981a), and estimates by the author.

created under the ETCP. The results of the estimation of this equation are presented in Table 4-11 (column 1).

Three main findings emerge. First, we find that in 1979 the social opportunity cost of an ETCP job was lowest in Newfoundland ($26.74 per week), followed by New Brunswick ($41.43), Nova Scotia ($59.59), Manitoba ($73.17), Quebec ($77.28), Ontario ($81.43), and Saskatchewan ($79.12). The cost was higher in British Columbia ($88.46) and highest in Alberta ($93.50) (Chart 4-6). The estimated weekly social opportunity cost of creating an ETCP job is less than the weekly ETCP wage for each of the provinces.[17] A case can thus be made on efficiency grounds for subsidizing job creation in the temporary sector in each province.[18] In this analysis, it is assumed that the ETCP wage would represent the best measure of the value of the workers' output.

Second, the social opportunity cost of an ETCP job is inversely related to the provincial unemployment rate

Table 4-11

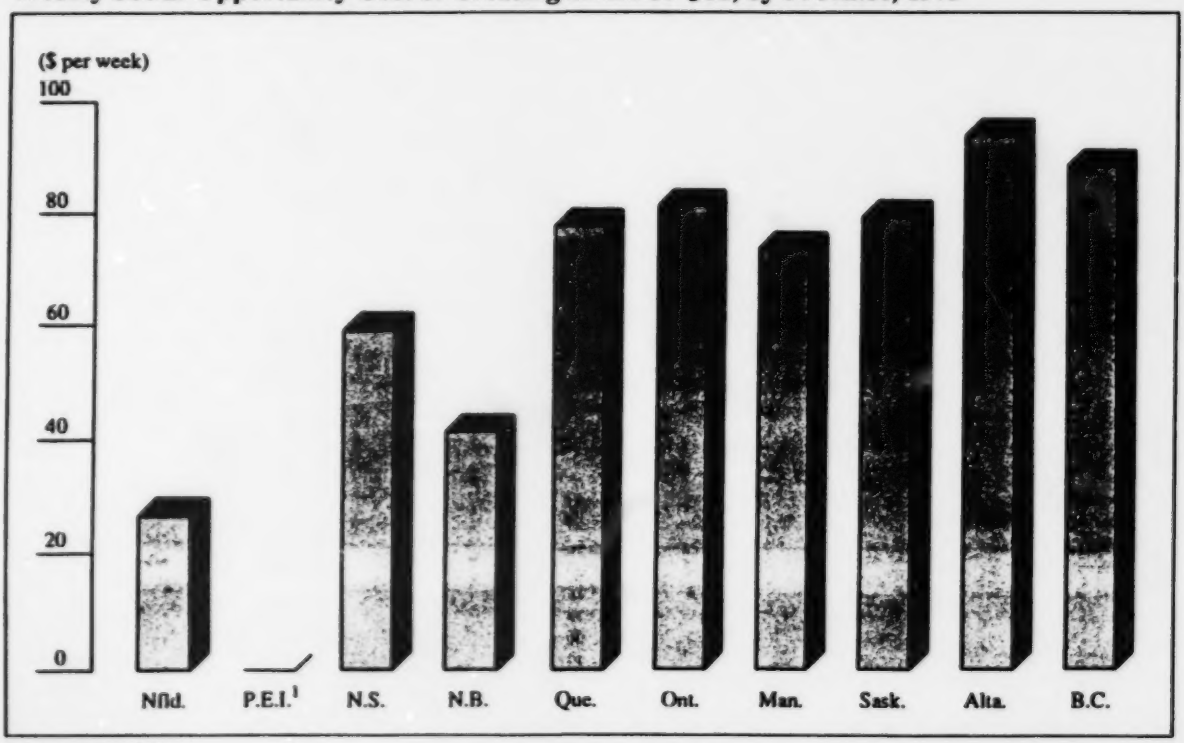
Weekly Social Opportunity Cost of Creating an ETCP Job, by Province, 1979

	SOCJ per week (1)	Net gain per ETCP job per week (ETCP wage minus the SOCJ) (2)
	($)	
Newfoundland	26.74	126.06
Prince Edward Island[1]	–	–
Nova Scotia	59.59	98.88
New Brunswick	41.43	129.60
Quebec	77.28	105.13
Ontario	81.43	95.14
Manitoba	73.17	85.62
Saskatchewan	79.12	94.83
Alberta	93.50	104.70
British Columbia	88.46	118.76

1 Data not available.
Source Estimates by the author.

Chart 4-6

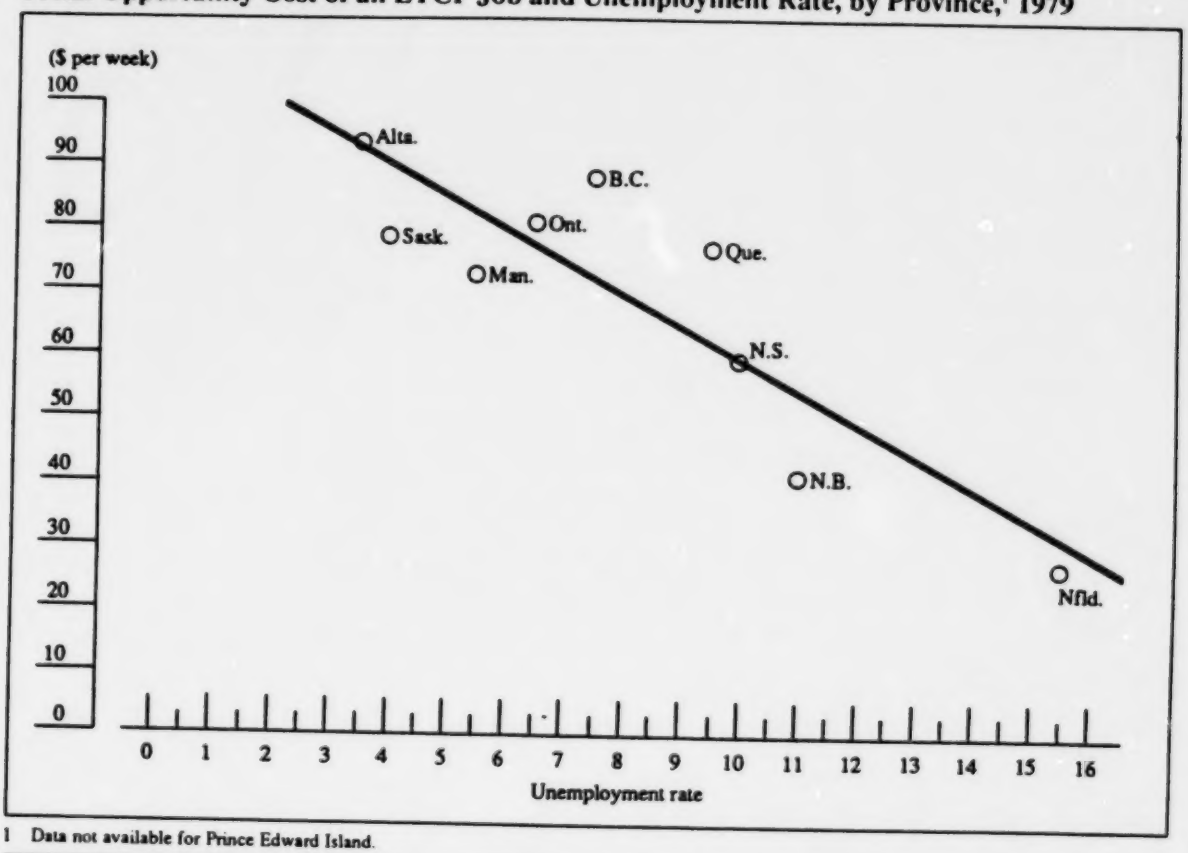
Weekly Social Opportunity Cost of Creating an ETCP Job, by Province, 1979



1 Data not available.

Chart 4-7

Social Opportunity Cost of an ETCP Job and Unemployment Rate, by Province,[1] 1979



1 Data not available for Prince Edward Island.

(Chart 4-7). In high-unemployment provinces (Newfoundland, New Brunswick, and Nova Scotia) the social opportunity cost of creating a job is lower relative to the low-unemployment provinces (Ontario, Manitoba, Saskatchewan, British Columbia, and Alberta).

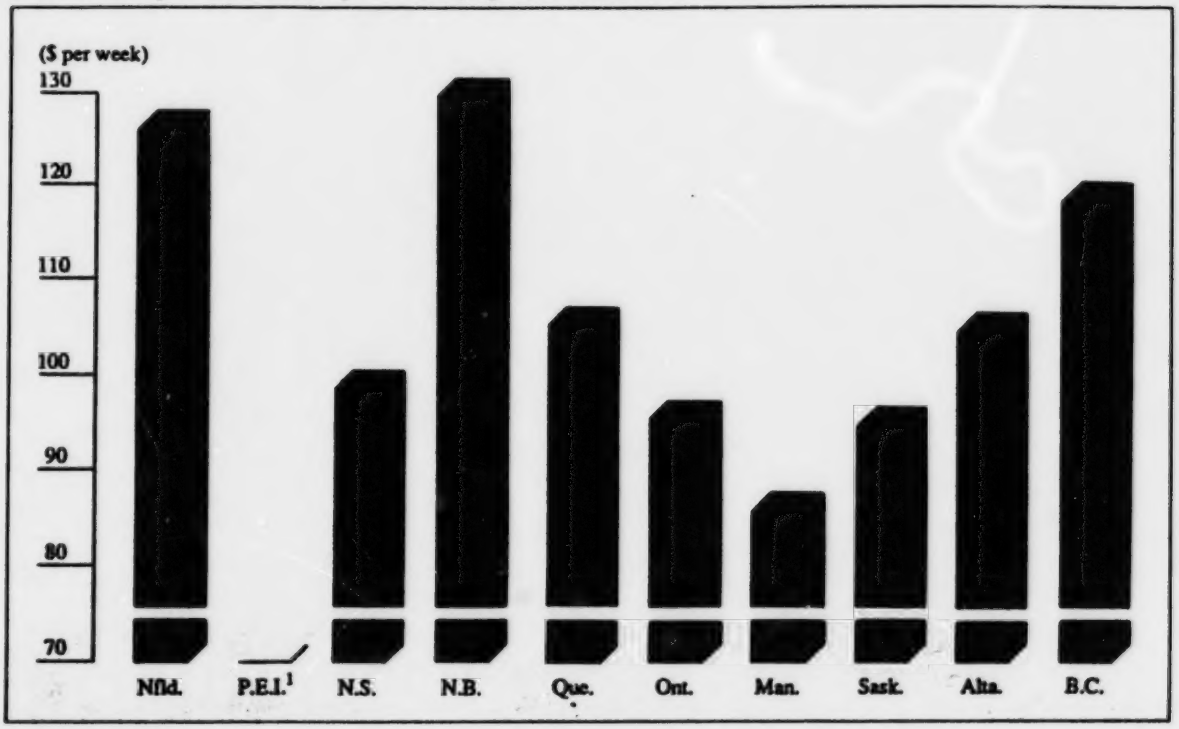
Finally, our estimates indicate that the employment incentive per ETCP participant should be higher in high-unemployment provinces than in low-unemployment provinces. To determine the appropriate relative rates of subsidization, we compare the average net gain (the ETCP wage minus the SOCJ) per ETCP job between provinces (see column 2 of Table 4-11 and Chart 4-8). There is a systematic positive relationship between provincial unemployment rates and average net benefit per ETCP job (Chart 4-9). The ETCP thus acted in the right direction by providing a relatively greater rate of tax credit to employers in high unemployment areas.

Conclusion

From the theoretical framework developed in this chapter we have been able to estimate the social opportunity cost of a job created through the ETCP. The analysis in this chapter indicates that the ETCP can be considered a socially efficient program and, accordingly, a case can be made for subsidizing job creation in the temporary sector of the labour market. The net social benefit resulting from the creation of an ETCP job was very significant. We estimate that the average net social benefit of "creating" a job in this way was about 60 per cent of the wage bill. The greatest net

Chart 4-8

Net Benefit per ETCP Job per Week, by Province, 1979



1 Data not available.

Main Findings

The main findings of this chapter are as follows. First, the length of time that ETCP workers would have spent unemployed in the absence of the program is consistent with the observed provincial unemployment rates. It is estimated that, on average, ETCP workers in Newfoundland would have spent 51 per cent of their labour force time in alternative jobs had the program not existed. In Alberta, where unemployment was low during the year under consideration, participants would have spent an average of 74 per cent of their time in alternative employment in the absence of the ETCP.

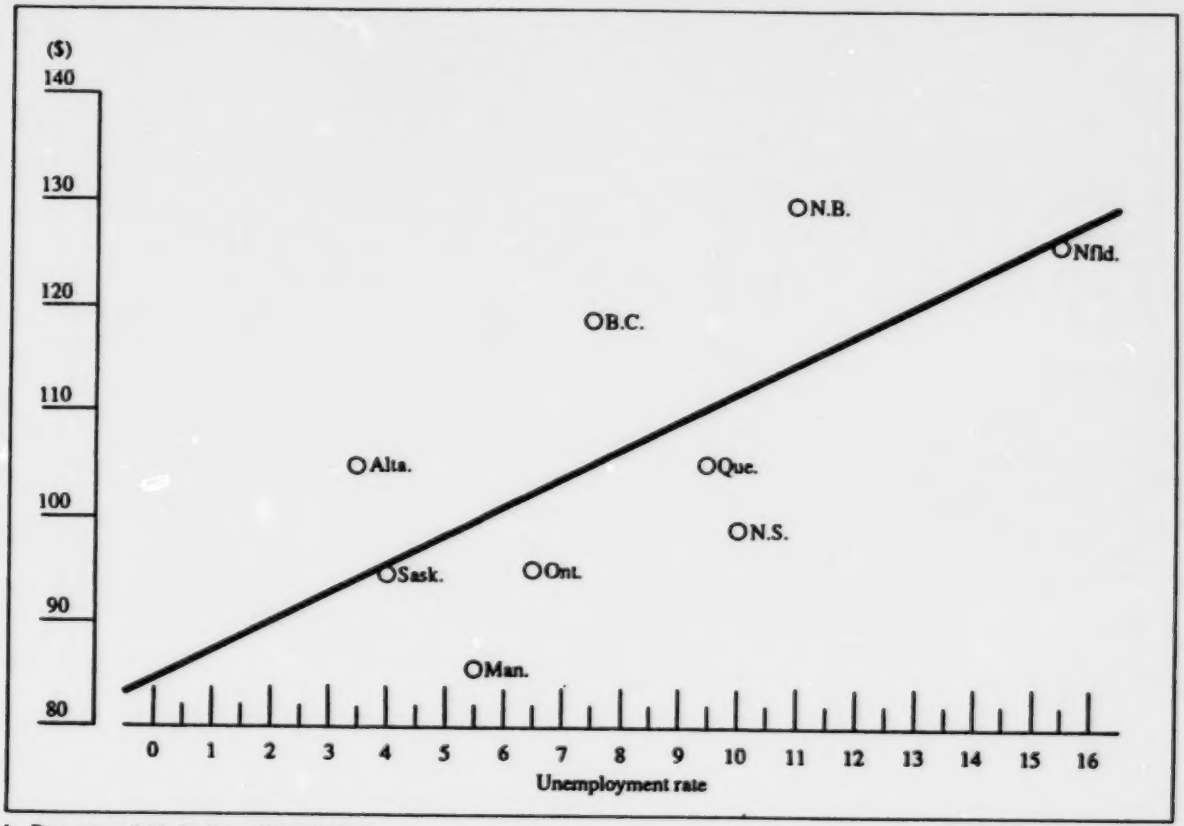
Second, the length of time during which ETCP workers would expect to receive UI benefits while unemployed does not differ markedly across provinces. The results suggest that the proportion of unemployed time during which ETCP workers expect to receive UI benefits varies between 80 per cent (for Manitoba and Saskatchewan) and 87 per cent (for Newfoundland and New Brunswick).

Third, we find that the value of nonmarket or leisure time that workers enjoy is not independent of the amount of time that they spend working. The estimated average weekly value of leisure time for an unskilled worker varies across provinces within a range of 5 to 39 per cent of the weekly ETCP wage rates, and it is inversely related to the provincial unemployment rate. As a percentage of the weekly wage, the value is lower for workers residing in New Brunswick (5 per cent) and Newfoundland (8 per cent) and higher for those in the western provinces (39 per cent in British Columbia and Alberta, 38 per cent in Saskatchewan and Manitoba). This value is 31 per cent in Quebec and Ontario. The low value of leisure in high-unemployment provinces has been used elsewhere as an important argument for creating jobs in depressed regions.

(cont'd.)

Chart 4-9

Net Benefit (Wage Minus the SOCJ) per ETCP Job and Unemployment Rate, by Province,[1] 1979



1 Data not available for Prince Edward Island.

Main Findings (concl'd.)

Fourth, we find that in 1979 the social opportunity cost of an ETCP job was lowest in Newfoundland ($26.74 per week), followed by New Brunswick ($41.43), Nova Scotia ($59.59), Manitoba ($73.17), Quebec ($77.28), Ontario ($81.43), and Saskatchewan ($79.12). The cost was higher in British Columbia ($88.46) and highest in Alberta ($93.50). The estimated weekly social opportunity cost of creating an ETCP job is less than the weekly ETCP wage for each of the provinces. A case can thus be made on efficiency grounds for subsidizing job creation in the temporary sector in each province.

Fifth, the social opportunity cost of an ETCP job is inversely related to the provincial unemployment rate. In high-unemployment provinces (Newfoundland, New Brunswick, and Nova Scotia), the social opportunity cost of creating a job is lower relative to the low-unemployment provinces (Ontario, Manitoba, Saskatchewan, British Columbia, and Alberta).

Finally, our estimates indicate that the employment incentive per ETCP participant should be higher in high-unemployment provinces than in low-unemployment provinces. To determine the appropriate relative rates of subsidization, we compare the average net gains (the ETCP wage minus the SOCJ) per ETCP job between provinces. There is a systematic positive relationship between provincial unemployment rates and average net benefits per ETCP job. The ETCP thus acted in the right direction by providing a relatively greater rate of tax credit to employers in high-unemployment areas.

social benefits come from the creation of jobs in labour markets characterized by high unemployment rates. On efficiency grounds, then, a justification can be made for relatively higher rates of subsidy for high-unemployment provinces. This would tend to support job creation policies like the ETCP, which have differential subsidy rates, rather than those policies which apply uniformly across provinces.

Note that the above conclusions are based on a model that is kept simple for expositional purposes. In order to give quantification to the model, the labour force is classified between skilled permanent workers and unskilled temporary workers. The findings are based on the empirical observations that the elasticity of demand for labour in the permanent sector is low. Moreover, the data on training costs used in the analysis are sketchy. A more intensive quantification would require: a) a proper measure of training costs for those sectors to which the temporary labour force would move when employed in permanent jobs; and b) a disaggregated estimate of the elasticity of demand for labour in the permanent sector.

5 The Net Employment Impact and the Cost Effectiveness of the ETCP

The aim of the ETCP was to create jobs for the unemployed by subsidizing incremental employment. We know from the official statistics that 113,182 unemployed workers were hired by the private sector in response to the ETCP. Does this mean that all the employment claimed to have been created by the ETCP was a net addition to the economy? It is generally argued that the net job creation impact of such programs is likely to be less than their gross impact, for a variety of reasons (Haveman and Christiansen, 1978; OECD, 1982). For example, an employment subsidy, by reducing the relative price of labour to a firm, may result in an additional worker being hired, but it may simultaneously reduce employment by some amount elsewhere in the economy through the resulting reduction in demand for capital or for other forms of labour. Moreover, the output produced by a subsidized firm may displace that of a nonsubsidized firm. Consequently, some of the employment reportedly created under the ETCP may have merely substituted for jobs abolished by nonsubsidized firms.

In the literature, these potentially offsetting impacts are referred to as displacements (OECD, 1982). In each case, the effect is to create a gap between the gross number of subsidized jobs and the net addition to employment in the economy. This gap, expressed as a ratio to the gross number of subsidized workers, is referred to as the "displacement effect" of the program. Consistent with this definition of displacement, then, the net employment effect of the ETCP depends on the extent to which labour demand reductions were imposed on the economy simultaneously with (and as an indirect effect of) the direct employment creation.

Furthermore, there is the possibility that some proportion of the subsidized job creation would have been undertaken even in the absence of the subsidy. The question generally asked is the following: Is the apparent increase in employment "real" or does part of it represent additional hiring that would have occurred anyway? In other words, did employers who availed themselves of the subsidy simply use it to finance hirings that otherwise would have been financed by their own means? Such a financial displacement creates a gap between the gross and net jobs created and is referred to as the "deadweight impact" of the program.

The major objective of this chapter is twofold. First, we wish to estimate the net impact of the ETCP on employment by taking into account its "displacement" and "deadweight" effects. Since the main objective of the program was employment creation, it must be assessed in terms of its net job creation impact, defined as the total employment in the economy with the program less the total employment without the program. Second, we want to estimate the budgetary cost per net job created by the ETCP and to evaluate its cost effectiveness with other instruments of employment policy such as direct job creation in the public sector, a general fiscal stimulus, or investment subsidies.

A Framework for Measuring the Net Employment Effect of the ETCP

In our model, described in Chapter 4 and in Appendix B, direct job creation in the temporary sector increases employment in that sector and decreases the supply of skilled labour in the permanent sector. Consequently, job creation in the temporary sector leads to a reduction of employment in the permanent sector. Assuming there is no excess demand for labour in the permanent sector – i.e., that the sector is in equilibrium – the decreased supply of skilled labour will increase wages in that sector. These considerations imply that a program emphasizing direct job creation in the presence of unemployment may simply be reducing the supply of skilled workers. The question that then arises is: What happens to total employment in the economy? Does it increase, decrease, or remain constant?

In terms of our model, the total employment (E) in both sectors of the economy is given by

$$E = N_2 + L_1, \tag{5.1}$$

where N_2 and L_1 denote employment in the temporary and permanent sectors, respectively. Total differentiation of equation 5.1 gives

$$dE = dN_2 + dL_1,$$

or

$$dE = \left(1 + \frac{dL_1}{dN_2}\right) dN_2, \tag{5.2}$$

where

dE = the change in total employment in the region;
dL_1/dN_2 = the change in employment in the permanent sector per unit of job creation in the temporary sector; and
dN_2 = total new jobs created in the temporary sector.

Thus,

$$dE \gtrless 0 \text{ as } \frac{dL_1}{dN_2} \gtrless -1. \qquad (5.3)$$

Whether total employment in the region would increase, decrease, or remain constant would depend on the value of dL_1/dL_2 (the displacement effect of the program). The lower (greater) the negative value of dL_1/dL_2, the larger (smaller) will be the net employment effect of the program.

In the presence of taxes and UI benefits, an expression for the displacement effect of the program (dL_1/dN_2) has already been derived earlier and is given by equation 4.8 in the previous chapter.

$$\frac{dL_1}{dN_2} = -\frac{[f_2'(1-t_2) - b \cdot d(1-t_2) - h]}{\{\Pi[f_2'(1-t_2) - b \cdot d(1-t_2) - h] - f_1''[1-t_1]L_2\}} \qquad (5.4)$$

To estimate the displacement effect of the ETCP, we need to estimate dL_1/dN_2 given by equation 5.4. The calculation of this essentially involves wages in the temporary sector ($\overline{W}_2 = f_2'$); the average tax rate in both sectors (t_1 and t_2); the unemployment insurance benefit rate (b); the size of the temporary sector (L_2); total employment in the temporary sector (N_2); the slope of the demand curve for labour in the permanent sector (f_1''); the probability of finding alternative employment for ETCP workers (Π); the proportion of time an ETCP worker is expected to receive UI benefits while unemployed (d); and the value of leisure time (h). The estimation procedure and determinants of these variables/parameters are covered in detail in Chapter 4. In this section, we simply intend to use those values to estimate dL_1/dN_2.

Estimating the Displacement Effects of the ETCP

The estimated results of the displacement effects are presented in Table 5-1. Column (1) shows the displacement effect of the program – i.e., the job loss in the permanent sector per unit of ETCP job creation in the temporary sector. Column 2 shows the total number of jobs created under the program during the period from April 1978 to March 1980. Column 3 shows the total job loss in the permanent sector as a result of the ETCP job creation in the temporary sector.

The results indicate that about 13 per cent of all jobs reportedly created by the ETCP merely displaced other jobs

Table 5-1

Displacement Effects of the ETCP, by Province, 1978-80

	Displacement effect (job loss in the permanent sector per unit of ETCP job creation in the temporary sector) • 100 (1)	Jobs created in the temporary sector by the ETCP during the period April 1978 to March 1980 (2)	Total job loss in the permanent sector due to ETCP job creation in the temporary sector [(1) × (2)/100] (3)
	(Per cent)		
Newfoundland	10.42	873	91
Prince Edward Island	–	463	–
Nova Scotia	6.25	1,527	95
New Brunswick	17.27	1,975	341
Quebec	13.98	25,472	3,561
Ontario	15.74	22,447	3,533
Manitoba	10.11	1,583	160
Saskatchewan	9.42	987	93
Alberta	9.49	2,119	201
British Columbia	3.61	8,318	300
Canada	12.82	65,764	8,375

Source: Estimates by the author.

and therefore did not constitute net additions to aggregate employment. The estimates of the displacement effect vary across provinces, ranging between 17.3 per cent (New Brunswick) and 3.6 per cent (British Columbia).

Estimating the Deadweight Impact of the ETCP

Some deadweight is inevitable. This results from firms receiving a subsidy for workers who would have been hired even without it and represents a windfall to the firm, in that it is paid on jobs that were not induced by a subsidy.

A number of approaches can be applied to measure the deadweight impact of the ETCP. For the present study, two approaches were utilized to estimate this effect. The first approach consisted of simply asking employers to state whether their hirings under the program were incremental. If some employers admit, after they have created job(s), that the hiring would have occurred anyway, this would help establish a potential ceiling for our estimates of the degree to which the program was able to restrict the subsidy only to incremental hirings.

A mail survey of 4,006 participating employers was conducted by Employment and Immigration Canada in March 1979. The survey achieved a response rate of 65 per cent. In order to determine the number of jobs in each firm whose creation was induced by the tax credit, employers were asked to agree or disagree with the following question: "The tax credit was an important factor in my decision to hire an Employment Tax Credit Program employee." A more specific question was also asked: "I would have hired about the same number of staff regardless of the program."

The responses to the above questions are presented in Table 5-2. Approximately 62 per cent of the employers said that, without the ETCP, the job(s) would not have been created. This suggests that there is a possibility that 62 per cent of the jobs created were "above planned growth" levels. About 26 per cent of the employers responded that the jobs would have been created anyway. Little reliance can be placed on the survey results, however, because of methodological weaknesses (such as a potential bias in employers' responses and little statistical control for other impacts on employment). These results do indicate, nonetheless, that employers felt that their hiring decisions were affected by the subsidy.

In order to develop a more objective approach to assessing the incremental employment impact of a job creation program, Haveman and Krutilla (1968) suggested a methodology focusing on this question: Given that the job is incremental, what is the probability that an individual hired under the program would have found a job somewhere else? The approach assumes that, at a given rate of aggregate unemployment, an unskilled worker's probability of employment indicates the likelihood that he would have been employed anyway.

Following their approach, we estimate the probability of employment of the ETCP participants for the years 1978 and 1979 (see Table 4-1). This is done by using the ETCP data linked with the longitudinal Labour Force Data Base. The data base has already been described in the previous chapter.

Table 5-3 shows, by province, the proportion of time that participants would have spent in alternative employment in the absence of the ETCP. Overall, the estimates indicate that 67 per cent of participants' time would have been so spent, leaving 33 per cent as the estimated real increase in employment due to the program. This suggests that the deadweight impact of the program was about 67 per cent. This figure assumes that the jobs themselves were additional to the hiring firms' work forces. The incremental employment was higher in Newfoundland, New Brunswick, Nova Scotia, and Quebec, and lower in Ontario and the western provinces.

Table 5-2

Responses[1] to the ETCP Employer Survey, by Province, March 1979

	Agree	Disagree	Do not know	Total
	(Per cent)			
Newfoundland	14.0	76.6	9.4	100.
Prince Edward Island	20.5	65.9	13.6	100.0
Nova Scotia	23.5	68.3	8.2	100.0
New Brunswick	23.3	69.9	6.8	100.0
Quebec	28.9	57.5	13.6	100.0
Ontario	21.3	68.3	10.4	100.0
Manitoba	21.7	66.3	12.0	100.0
Saskatchewan	22.2	63.9	13.9	100.0
Alberta	28.4	61.7	9.9	100.0
British Columbia	29.3	58.6	12.1	100.0
Canada	25.8	62.2	12.0	100.0

1 Employers were asked to state whether their hirings under the ETCP were incremental.

Source Employment and Immigration Canada.

Table 5-3

Deadweight Impact of the ETCP, by province, 1978 and 1979

	Deadweight impact based on the mean estimated probability of employment (Π)[1]
	(Per cent)
Newfoundland	0.49
Prince Edward Island	–
Nova Scotia	0.61
New Brunswick	0.51
Quebec	0.63
Ontario	0.70
Manitoba	0.73
Saskatchewan	0.74
Alberta	0.72
British Columbia	0.73
Canada	0.67

1 Based on the estimated coefficients from the WLS regression reported in Table 4-1 and the mean value of independent variables for those individuals who joined the ETCP during 1978 and 1979.

Source Estimates by the author.

The Net Employment Effect of the ETCP

To estimate the net employment effect of the ETCP, the total number of jobs claimed to have been created by the program were adjusted downward to reflect displacement effects and deadweight impacts. The net effect was calculated in the following manner:

Net number of ETCP jobs created = (Total number of ETCP subsidized jobs minus jobs displaced by the program minus jobs that would have been created even in the absence of the program).

The results are presented in Table 5-4. The estimates suggest that the net number of jobs created by the ETCP were just over 20 per cent. This would then suggest that the ETCP created only 13,271 net jobs over the period from April 1978 to March 1980, instead of the 65,764 jobs claimed to have been created. The net employment effect of the program was relatively higher in Newfoundland, New Brunswick, Nova Scotia, and Quebec, and lower in the western provinces (except British Columbia) and Ontario. The provinces with relatively high unemployment, then, had a higher net job creation rate (see Chart 5-1).

Note that our analysis of the net effect of the ETCP on employment has not taken into consideration the indirect effects, such as the demand-side multiplier effects – i.e., the additional jobs created as a consequence of the newly created subsidized jobs. Newly created jobs lead to more income being spent, which in turn generates more income, spending, jobs, etc. It was assumed that such effects, though important, would not make a significant difference in the calculations.

Some studies have attempted to calculate the net employment effects of subsidies. A study in the United States has estimated the net employment effect of the New Jobs Tax Credit program in the construction and retailing industries, concluding that 20 to 30 per cent of the observed total employment increase in these industries was due to the subsidy program (Bishop and Haveman, 1979). In the United Kingdom, to evaluate the net employment impact of the Small Firms Employment Subsidy program, a comparison of employment increases in subsidized firms with those in a sample of control firms not receiving the subsidy was made. In addition, an employer's survey was also conducted. Results from both methods indicated that 40 per cent of the subsidized workers were actually hired as a result of the subsidy. A French study of the First National Pact also concluded that the net employment impact was in the range of 15 to 40 per cent. In summary, these various results suggest that the net employment effect of subsidies can vary from as low as 15 to 20 per cent of the total number of subsidized jobs (in West Germany and France) to as high as 67 per cent (in the United Kingdom) (United Nations, 1984; International Labour Organization, 1979; Metcalf, 1982; Schwanse, 1982; Tannenwald, 1982). For a comparison across countries, see Table 5-5.

The Budgetary Cost per Net Work-Year Created by the ETCP

In order to estimate the cost, from the policy maker's perspective, of creating a net work-year of ETCP employment (by province), we need three additional sets of data: 1) the gross number of work-years created under the ETCP, by province; 2) the total budgetary cost of the work-years created under the ETCP, by province; and 3) the marginal tax rate applicable to the income of the participating employers, since the tax credit was taxable.

The information required under the first two items above was provided by Employment and Immigration Canada and appears in columns 1 and 2 of Table 5-6. Since the tax credit was taxable it had to be adjusted for the average marginal rate at which business income was taxed during the ETCP years. Consider, for example, a corporation receiving the maximum credit of $2 per hour for 40 hours a week for one year. The total tax credit is thus $2 × 40 × 52 = $4,160. The

Table 5-4

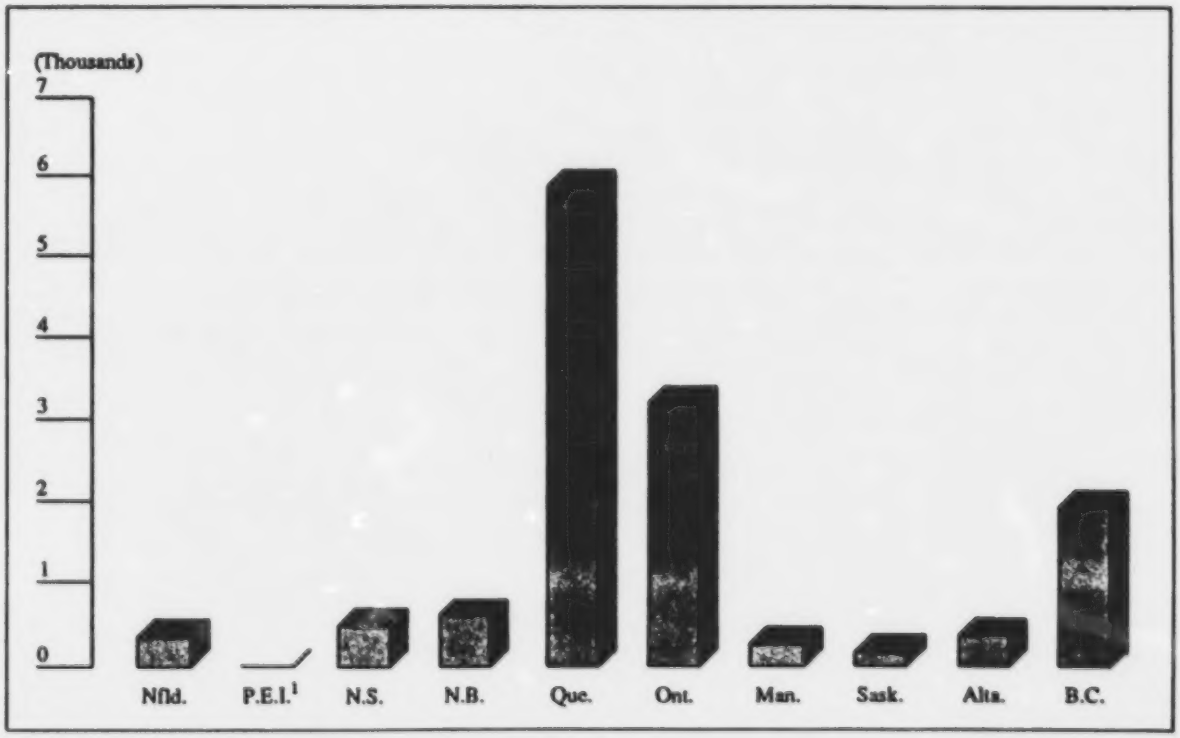
Net Employment Effect of the ETCP, by Province, 1978-80

	Displacement effect (1)	Deadweight impact (2)	Adjustment for displacement and deadweight effects (1) + (2) (3)	Net percentage of jobs created by the ETCP [100 – (3)] (4)	Total number of jobs subsidized by the ETCP (5)	Net number of jobs created by the ETCP [(5) × (4)/100] (6)
			(Per cent)			
Newfoundland	10.42	49	59.42	40.58	873	354
Prince Edward Island	–	–	–	–	463	–
Nova Scotia	6.25	61	67.25	32.75	1,527	500
New Brunswick	17.27	51	68.27	31.73	1,975	627
Quebec	13.98	63	76.98	23.02	25,472	5,864
Ontario	15.74	70	85.74	14.26	22,447	3,201
Manitoba	10.11	73	83.11	16.89	1,583	267
Saskatchewan	9.42	74	83.42	16.58	987	164
Alberta	9.49	72	81.49	18.51	2,119	392
British Columbia	3.61	73	76.61	23.39	8,318	1,946
Canada	12.82	67	79.82	20.18	65,764	13,271

Source: Employment and Immigration Canada, and estimates by the author.

Chart 5-1

Net Number of Jobs Created by the ETCP, by Province, 1978-80



1 Data not available.

Table 5-5

Net Employment Effect of Selected Subsidy Programs in Some Industrialized Countries

	Net jobs created as a proportion of total jobs asserted to be created by the program
	(Per cent)
First National Employment Pact (France)	15 to 40
Incentive Bonus for Job Creation (France)	30
Wage Cost Subsidy (West Germany)	20 to 30
Premium Employment Programme (Ireland)	17 to 21
Employment Maintenance and Training Subsidy (Sweden)	38 to 46
Temporary Employment Subsidy (United Kingdom)	33 to 67
Small Firms Employment Subsidy (United Kingdom)	40
New Jobs Tax Credit (United States)	20 to 30
Employment Tax Credit Program (Canada)	20

Source United Nations (1984), and estimates by the author.

tax credit must be added to the firm's income since it is taxable. If a corporation is paying tax at a 46 per cent rate, the net credit available is $\$4,160 - (0.46 \times \$4,160) = \$2,246$ per new hiring. Naturally, corporate tax rates are far from uniform across the economy. The rates effectively paid differ, for example, across industries, across provinces, across firm sizes, and across ownership statuses (i.e., Canadian or foreign firms). In the absence of accurate information on the marginal tax rates of participating firms, it was assumed that the approximate average marginal tax rate in 1979 was 40 per cent.

Estimates of the budgetary cost effectiveness of the ETCP, reflecting adjustments for displacement and deadweight impacts and for taxes, are presented in column 5 of Table 5-6. The budgetary costs per net work-year created differed substantially from province to province, ranging from $5,758 in Newfoundland to $12,549 in Ontario, with the national average being $9,375 (Chart 5-2).[1] The national estimates take into account the fact that only 20 per cent of the jobs created under the ETCP represent net job creation. Our estimates of the net budgetary costs per net work-year are biased upward to the extent that they do not take into consideration the increased savings resulting from fewer workers collecting unemployment insurance benefits and from the tax revenues, if any, collected from participating workers.

By comparison, a U.S. study has suggested that estimates of the cost per job for wage subsidy programs range from $8,000 to $10,000 (Hamermesh, 1978). U.S. estimates for the New Jobs Tax Credit program suggest that the cost per

Table 5-6

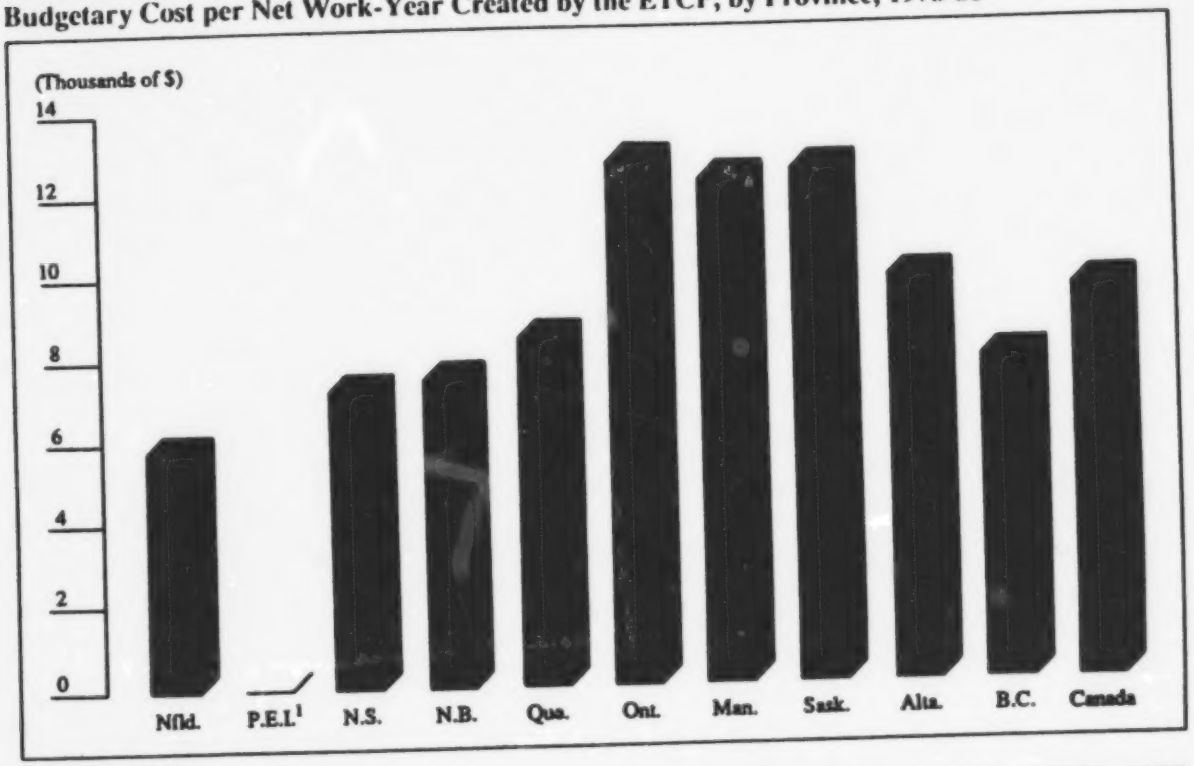
Cost per Net Work-Year Created by the ETCP, by Province, 1978-80

	Gross number of work-years created[1] (1)	Total budgetary cost of work-years created (2)	Number of net work-years created [(1) adjusted for displacement and deadweight effects] (3)	Net budgetary cost of work-years created [(2) adjusted for taxes] (4)	Budgetary cost per net work-year created by the ETCP [(4)/(3)] (5)
		($)		($)	($)
Newfoundland	433.5	1,688,049	175.9	1,012,829	5,758
Prince Edward Island	925.5	3,603,897	–	–	–
Nova Scotia	720.0	2,803,680	235.8	1,682,208	7,134
New Brunswick	221.0	860,574	70.1	516,344	7,366
Quebec	13,502.5	43,506,488	3,108.3	26,103,893	8,398
Ontario	10,611.5	31,647,340	1,513.2	18,988,404	12,549
Manitoba	847.5	2,893,365	143.1	1,736,019	12,132
Saskatchewan	474.5	1,619,943	78.7	971,965	12,350
Alberta	4,267.5	12,708,494	789.9	7,625,096	9,653
British Columbia	1,064.0	3,184,312	248.9	1,910,587	7,676
Canada	33,146.5	104,516,142	6,689.0	62,709,685	9,375

1 Represents the gross number of work-years created during the first two years of the program (April 1978 through March 1980).
Source Employment and Immigration Canada, and estimates by the author.

Chart 5-2

Budgetary Cost per Net Work-Year Created by the ETCP, by Province, 1978-80



1 Data not available.

net job created ranged between $14,000 and $17,100 (Tannenwald, 1982). Estimates by the U.S. Congressional Budget Office indicate that in fiscal year 1979 CETA-sponsored public-service employment programs created jobs at a unit cost of between $10,000 and $20,000, depending on the degree of assumed fiscal substitution (cited in Tannenwald, 1982). In Canada, the average person-year cost of creating a job in the public sector is approximately $14,000, according to estimates by the Economic Council of Canada (1982); $8,000, according to estimates by the OECD (1980); and $7,500, according to estimates by Employment and Immigration Canada (1981*b*). The Economic Council's estimates are based on the estimated fiscal-substitution effect ranging between 50 and 70 per cent. These cost estimates compare favourably with an average person-year cost of about $20,000 by OECD estimates for jobs created via generalized government purchases or tax cuts, and of up to $30,000 through quotas and other forms of trade restrictions (EIC, 1981*b*).

Main Findings

The main findings are as follows. First, a major problem associated with employment subsidy programs involves "displacement" effects – the reduction of jobs elsewhere as an offset to the employment creation effects of the program. Approximately 13 per cent of all jobs reportedly created by the ETCP merely displaced other jobs and therefore did not constitute net additions to total employment in the economy. The provincial estimates are in the 4-to-17-per-cent range.

Second, the "deadweight" impact of the ETCP was substantial. About 67 per cent of the participants would have been hired even without the subsidy. This resulted into large windfalls to employers.

Third, the net employment impact of the ETCP was low, when the displacement and deadweight factors were taken

into consideration. The estimates suggest that only 20 per cent of the total number of jobs subsidized by the program represented net job creation. The estimates differ substantially from province to province, ranging from approximately 41 per cent in Newfoundland to about 14 per cent in Ontario. The provinces with relatively high unemployment had a high net job creation rate.

Finally, the average cost per person-year of net ETCP jobs is about $9,400. Our estimates suggest that the ETCP was a cost-effective program. It created jobs more cost-effectively than public-service employment programs (on the basis of the Economic Council's estimates) and than generalized government expenditure or income tax cuts.

6 The Postprogram Labour Market Performance of the ETCP Participants

Employment and training programs are generally directed towards improving the long-term employment prospects of participants. Such programs, whether aimed at providing general training, specialized work-skills training, work experience, or on-the-job training, are intended to augment the human capital of participants and to increase the size and stability of their earnings.[1] In Chapter 4, while analysing the benefits to society of creating an ETCP job, we used the ETCP wage as a proxy for the social value of the output created, on the assumption that it equals the value of the worker's contribution. In doing so, we ignored any additional future output that program participants might provide because of an increase in their productivity arising from work experience or from on-the-job training. This increase in worker productivity has the characteristics of an investment – once the increase in productivity is attained, it persists at some level into the future. This future gain must also be reflected in the calculation of the output produced by a new job. The way to accomplish this, at least conceptually, is to add up the future values of increased output and attribute the present discounted value to the program.

Thus, a potential by-product of the ETCP was improvement in the future employability of program participants. But some analysts have suggested that job creation programs do not provide much training aimed at improving participants' skill levels (Haveman and Palmer, 1982). In this chapter, therefore, we evaluate the impact of the program on participants' earnings and on other employment-related outcomes. In particular, we analyse the labour market impact of the ETCP on those individuals who participated in the program, with a view to answering the following questions: 1) Did the program increase the future probability of employment for those who participated in it? 2) Did it increase the length of subsequent employment per spell for participants? 3) Did it increase the weekly wages of participants at their future job(s)?

Some Descriptive Statistics

To monitor the postprogram performance of participants, one needs a continuous, long-term follow-up. Even if one ignores the feasibility or expense of such a follow-up, there is a substantial time lag before the required data will be available. Thus the need for more-timely information imposes a constraint in evaluating the effectiveness of the programs.

In the absence of a follow-up survey regarding the employment and unemployment patterns of ETCP participants during and after their experience on the program, some information was generated from the Records of Employment (ROE) completed by employers (the information was provided by EIC).

About 73 per cent of first-year program participants – some of whom started work as early as April 1978 – were no longer in ETCP jobs in June 1980. Those who left their subsidized job worked for an average of 24.3 weeks with the ETCP employer. Some proportion of the other 27 per cent may have remained with the ETCP employers, having worked for between 15 and 27 months.

About 79 per cent of the employers, according to the employer survey, reported that ETCP workers were of equal quality with regular employees and were equally productive. The survey results also showed that about 44 per cent of the ETCP participants had been laid off from their subsidized job, while 30 per cent had quit, and 21 per cent had been fired.

For those ETCP participants who subsequently found a job, the follow-up period was too short to draw any conclusions about the quality and duration of those jobs. Of the 3,400 sample cases known to have left their ETCP employment, about 40 per cent had found new jobs by the end of June 1980. The average wage in these new jobs was about $173 per week. Between jobs, about 74 per cent of unemployed first-year ETCP participants collected UI benefits at some time after being placed in the program.

Evaluation Issues

To measure the impact of the ETCP on the participants' labour market experience, we need a method to determine what the labour market experience of participants would have been had they not participated in the program. For example, even if we do find that the postprogram employ-

ment probability of participants increased, it must still be established that this is a result of the program and is not due to other changes such as generally improved economic conditions. Comparing the employment probability of program participants to that of control group members who did not participate in the program allows one to distinguish general changes in the employment probability from the ETCP effects. This comparison should be made over a number of time periods. Since data are not available over long time periods, an estimate of long-run effects was made on the basis of an estimate of the program's initial impact.

Selection of the Control Group

On the issue of how to select an appropriate control group,[2] it has been suggested that one could probably be constructed inexpensively from an existing longitudinal data set. Individuals from the data set could be matched with program participants on the basis of demographic characteristics and "preprogram" labour market experiences.[3] Following this suggestion, we constructed a control group from the longitudinal Labour Force Data Base (LFDB). Individuals from the data set were matched with ETCP participants on the basis of demographic characteristics – age, sex, and region – and "pre-ETCP" labour market experiences. Using the employment starting date as an additional characteristics, we drew a sample of 811 individuals from the LFDB to serve as a control group. Naturally, the control group and the ETCP participant group were not drawn from the same population. The best that could be done in these circumstances was to control statistically for observable differences between the two groups, using measurable variables.

Table 6-1 illustrates the demographic composition of the ETCP sample and the control group. In the ETCP sample, men outnumbered women by a ratio of two to one, whereas the ratio was about four to one in the control group. There are no significant differences in age distribution between the two groups. The provincial representation of the ETCP sample and the control group is almost identical, except that Alberta is a little over-represented – and Quebec, slightly under-represented – in the control group.

Table 6-2 illustrates the labour market experience of each group during the period from 1975 to the ETCP joining date. The observed employment/unemployment experience of the ETCP participants in our sample indicates that the mean probability of employment and unemployment, and the mean proportion of unemployed time during which UI benefits were received, are almost identical for men and women. The average duration of unemployment and the average number of spells of unemployment are higher – and the average length of unemployment per spell is lower – for men than for women. The employment/unemployment experience of the control group is marginally different from that of the ETCP sample. For example, the control group's mean probability of employment is typically above that of the ETCP sample. The average duration of unemployment and length of unemployment per spell are lower for the control group than for the ETCP sample. As a result, it is important to adjust for differences between the two groups.

Table 6-1

Demographic Characteristics of the ETCP Sample and the Control Group, 1975 to 1978/79

	ETCP sample	Control group
	(Per cent)	
Men	69.6	78.3
Women	30.4	21.7
Age group (in 1975)		
Less than 19	44.4	41.7
20 to 24	22.4	22.7
25 to 44	27.1	29.6
45 to 64	6.1	5.9
Newfoundland	1.9	2.8
Prince Edward Island	0.8	0.7
Nova Scotia	2.2	3.3
New Brunswick	4.7	3.6
Quebec	42.1	35.6
Ontario	28.0	30.1
Manitoba	2.7	1.7
Saskatchewan	1.9	1.8
Alberta	2.7	6.0
British Columbia	12.9	12.9

Source: Employment and Immigration Canada, sample ETCP file linked with the LFDB, 1975 to 1978/79, and estimates by the author.

Determinants of the Change in the Probability of Employment

The change in the probability of employment of the ETCP participants, relative to the change in that of members of the control group and adjusted for the effects of differences in age, occupation, industry, and previous employment (*PEMP*) experience, was viewed as the effect of the program.

The change in the probability of employment (ΔPE) is defined as

Table 6-2

Labour Market Experience of the ETCP Sample and the Control Group, by Sex, 1975 to 1978/79

	ETCP sample			Control group		
	Men	Women	Total	Men	Women	Total
			(Per cent)			
Labour market characteristics:[1]						
Mean probability of employment (Π)	0.67	0.66	0.67	0.73	0.77	0.74
Mean probability of unemployment ($1 - \Pi$)	0.33	0.34	0.33	0.27	0.23	0.26
			(Weeks)			
Average duration of unemployment (*ADU*) per person	37.4	32.0	35.8	30.2	26.1	28.1
Average length of unemployment per spell (ALU_s)	24.2	27.7	25.0	21.9	22.3	22.0
			(Number)			
Average number of spells of unemployment per person (n)	1.7	1.4	1.6	1.5	1.3	1.4
			(Weeks)			
Average length of employment per spell (ALE_s)	17.8	22.0	18.7	18.1	21.2	18.6
			(Number)			
Average number of spells of employment per person (m)	4.3	2.8	3.9	4.4	3.2	4.2
			(Per cent)			
Mean proportion of unemployed time during which UI benefits were received (d)	0.88	0.88	0.88	0.86	0.85	0.86

1 For calculation of these variables, see Table C-2 in Appendix C.
Sources Employment and Immigration Canada, sample ETCP file linked with the LFDB, 1975 to 1978/79, and estimates by the author.

$$\Delta PE = \left(\Pi_{ap} - \Pi_{bp} \right),$$

where

Π_{bp} = (Total number of weeks individual employed one year prior to the program joining date)/(Total number of weeks in labour force during that one-year period); and

Π_{ap} = Total number of weeks individual employed one year after the program joining date)/(Total number of weeks in labour force during that one-year period).

The calculation of Π_{bp} and Π_{ap} is restricted to one year before, and after, the program because of the restriction imposed by the available Records of Employment file which contained information until August 1980 at the time of estimation. The variable $(\Pi_{ap} - \Pi_{bp})$ is interpreted as the change in the probability of being employed.

Following Kiefer (1976), each individual's expected change in probability of employment, ΔPE_e, can be captured by a vector, X_i, denoting his(her) productivity characteristics and the labour market conditions as his(her) ETCP status. The ΔPE_e function then can be given as

$$\Delta PE_e = b_i X_i + a_1 \, ETCP + a_2 \, ETCP \, weeks. \qquad (6.1)$$

An individual's market productivity characteristics are generally captured by variables such as education, training, and age. From the data available to us, we do not have measures of education or training. The variable proportion of time employed before the estimation period (*PEMP*) is used as a measure of work experience, which reflects the productivity characteristics of individuals. The changing labour market indicator is identified by the average national unemployment rate and by province. The occupation and industry variables are used as control variables.

In the regressions, "*age*" is the age of the person at the beginning of 1975; *PEMP* is the proportion of the labour force time spent in employment before the estimation period; *Urate* is the average national unemployment rate during the period; occupation (*OCC*), industry (*IND*), province (*PROV*), and *ETCP* variables are dummies. *OCC* takes on a value of one, where it coincides with the worker's

last occupation prior to joining the ETCP, and zero otherwise. *IND* takes the value of one, if the worker's last industry of employment belonged to that category, and zero otherwise. Similarly, *PROV* takes the value of one, if the individual lived in that province, and zero otherwise. The description of the variable mnemonics (for example, *OCC*, *IND*, *PROV*, etc.) can be seen in Table C-1 in Appendix C. *ETCP* takes on the value of one, if the individual was a program participant, and of zero otherwise (control group). *ETCP weeks* is the number of weeks the individual was in the program.

The conditional distribution of an ETCP participant's probability of employment for a given number of weeks of program participation in this framework differs from the conditional distribution of the control group's probability of employment only in location, and the difference in location is

$$a_1 + a_2 \, ETCP \; weeks. \qquad (6.2)$$

In our empirical analysis, the focus is on the coefficient for the *ETCP* variable – the participation in the program. If participation in the program increased the postprogram probability of employment, then one would expect the coefficient a_1 of the *ETCP* variable to be positive. The coefficient a_2 of the *ETCP weeks* variable may be interpreted as denoting an additional impact on the change in the probability of employment if the participant stayed in the program an additional week.

Equation 6.1 is estimated by ordinary least squares separately for males and females.[4] The rationale for estimating separately by sex is that the probability of employment is affected by differences between the occupational and industrial distributions of male and female workers. In our sample, male participants were mostly employed in goods-producing industries such as manufacturing, construction, and transportation, while a majority of female participants were employed in community, business, and personal services, finance, and trade. In order to isolate the influence of the industrial and occupational differentials on the change in the probability of employment, the equation is estimated separately for males and females.

Once the parameters are estimated, the average effect of the ETCP may be obtained by evaluating equation 6.2 at the mean number of weeks the participant spent in the program. The main results are presented in Table 6-3. The overall explanatory power of the equation in all the cases is very weak (R^2 is equal to 0.06 for males and for the total sample; the F-statistics is equal to 3.11 for males and 3.93 for the total sample), except for the female sample (R^2 = 0.15 and F = 2.42). This leads us to conclude that for the

Table 6-3

OLS Estimates[1] of the Change in the Probability of Employment of the ETCP Participants, One Year before and One Year after the Program

	Men	Women	Total
		(*t*-statistics)	
Coefficients of:			
Intercept	–1.054	–1.584	–1.189
	(4.19)	(3.48)	(5.43)
Age	0.001	–7.842	0.0007
	(0.96)	(0.03)	(0.58)
PEMP	–0.167	0.007	–0.107
	(4.26)	(0.10)	(3.23)
Urate	0.078	0.108	0.083
	(2.50)	(1.91)	(3.04)
ETCP	0.011	–0.086	–0.016
	(0.32)	(1.22)	(0.52)
ETCP weeks	0.001	0.006	0.002
	(0.57)	(1.75)	(1.26)
Average ETCP effect	0.030[2]	0.042	0.023
	(0.44)[3]	(0.30)	(0.38)
		(Weeks)	
Mean of ETCP weeks	18.82	21.36	19.6

1 The estimation results for other variables (such as occupation, industry, province) are not presented in this table but are available from the author on request.

2 This value is derived as $(a_7 + a_8 \cdot \overline{ETCP\ WKS})$.

3 These *t*-statistics are based on the standard errors derived according to the relation var $(a_7 + a_8 \, ETCP\ WKS)$ = var (a_7) + $ETCP\ WKS^2$ var (a_8) + 2 $ETCP\ WKS$ cov (a_7, a_8).

ETCP participants, most of the socioeconomic characteristics, even when taken together, have a very low predictive power in explaining the change in the probability of employment.

The effect of the Employment Tax Credit Program on the change in the probability of employment was not found to be statistically significant, indicating that the program did not succeed in increasing the future probability of employment of its participants. It is generally argued that wage subsidy programs in the private sector not only ensure that the output produced meets the conventional tests of consumer demand, but also that it creates jobs directly in regular employment, so workers are not making a transition

from special temporary programs (Haveman, 1980). Our results suggest that the probability of employment of participants after the program did not change and that the dynamics of the employment/unemployment transition continued as in the preprogram period.

The Postprogram Length of Employment (per Spell) of Participants

We also conducted an analysis of the effect of the ETCP on the weeks of employment (per spell) after the program. The framework used was similar to that used in the analysis of the probability-of-employment changes. The length of the subsequent employment spell of the program participants, relative to that of the control group and adjusted for the effects of differences in age, occupation, industry, weekly wage rate (W_t) in the present job, and the weeks of employment in the previous job ($EWKS_{t-1}$), was taken as the effect of the program. The following equation was estimated as

$$EWKS_t = b_0 + b_1\, Age + b_2\, EWKS_{t-1} + b_3\, Urate + b_4\, W_t + b_5\, OCC + b_6\, IND + b_7\, PROV + b_8\, ETCP + b_9\, ETCP\ weeks + e_t . \quad (6.3)$$

where e_t is the error term, and the total effect of the ETCP on weeks of employment per spell is given by

$$b_8 + b_9\, ETCP\ weeks. \quad (6.4)$$

Equation 6.4 is evaluated at the mean number of weeks the participant spent in the ETCP. The coefficient of *ETCP weeks* may be interpreted as the number of additional employment weeks (per spell) that a program participant will gain if he(she) stays in the program an additional week.

OLS estimates of the coefficients of *ETCP* (b_8) and *ETCP weeks* (b_9) and *t*-statistics are presented in Table 6-4, along with their estimated average effects on the employment length per spell.

In all cases, the coefficient of the *ETCP* variable is negative and statistically significant, whereas the coefficient of the *ETCP weeks* variable is positive and also statistically significant, suggesting that the participants who stayed in the program longer had a longer employment length (per spell) after the program.[5] Strong positive average employment effects of the ETCP are found for both men and women, although they are larger for women.

Table 6-4

OLS Estimates[1] of the Total Number of Weeks of Employment per Spell, ETCP Participants, 1975-80

	Men	Women	Total
		(*t*-statistics)	
Coefficients of:			
Intercept	5.983	5.186	6.741
	(4.47)	(1.74)	(3.89)
Age	0.001	0.029	0.010
	(0.08)	(0.93)	(0.86)
$EWKS_{t-1}$	0.098	0.036	0.081
	(13.37)	(2.55)	(12.71)
Urate	0.803	0.693	1.416
	(5.58)	(2.17)	(9.27)
W_t	–0.003	–0.003	–0.003
	(10.40)	(4.50)	(12.77)
ETCP	–12.626	–13.810	–11.344
	(16.57)	(8.48)	(16.42)
ETCP weeks	0.926	0.961	0.922
	(21.53)	(11.01)	(24.21)
Average ETCP effect	4.801[2]	6.716	6.727
	(3.06)[2]	(2.93)	(4.65)
		(Weeks)	
Mean of ETCP weeks	18.82	21.36	19.6

1 The estimation results for other variables (such as occupation, industry, province) are not presented in this table but are available from the author on request.

2 For calculation procedures, see notes to Table 6-3.

The Postprogram Increase in Weekly Wages of Participants

The major objective of the ETCP was to stimulate employment and reduce the level of unemployment in the economy. The desire to reduce unemployment stemmed from concerns about the lower earnings of unemployed workers: if participants in the program suffered less unemployment after leaving it, their earnings should be higher (Ashenfelter, 1978*a*) In the literature on job creation, the question is also frequently raised whether these programs increase the postprogram earnings of the individuals. To our knowledge, there is no empirical evidence on this issue. The data enabled us to estimate the effect of the ETCP on participants' earnings. Any change in earnings may result in part from a result of a change in employment and

in part from a change in the weekly wage rate. The impact of the ETCP on the change in employment was examined earlier in this chapter, and we now concentrate on its effect on the weekly wages of participants. This quantitative assessment will provide a measure of the success of the program.

On the basis of our earlier discussion, it is clear that information on the wages of participants is not, by itself, sufficient in analysing the effects of the program on wages in a changing economy. It is also necessary to have an adequate control group of individuals against whom to compare the wages of program participants, so that general changes in wages are not interpreted as resulting from the program. The present data include only those program participants and control group members who were included in the earlier section pertaining to the change in the probability of employment. The differences between the ETCP participants and the control group with respect to changes in weekly wages, adjusted for the effects of differences in age, previous employment experience, and so on, were viewed as representing the impact of the program.

In the empirical analysis, the dependent variable is defined as

$$\Delta W = W_{ap} - W_{bp},$$

where

ΔW = the change in average weekly wages one year after the program from one year before;
W_{ap} = the average weekly wages one year after the program; and
W_{bp} = the average weekly wage one year before the program.

Each individual's expected change in wages, ΔW_e, conditional on his age, previous employment experience, previous occupation, industry, province, and ETCP status, is assumed to be given by

$$\Delta W_e = b_i X_i + C_1 \, ETCP + C_2 \, ETCP \; weeks, \qquad (6.5)$$

where vector X_i is represented by a set of the same independent variables that were included in equation 6.1. As in that equation, the conditional distribution of ETCP participant weekly wages for a given number of weeks in the program differs from the conditional distribution of the control group weekly wages only in location. The difference in location is

$$C_1 + C_2 \, ETCP \; weeks. \qquad (6.6)$$

The weekly wages in this data base are obtained from UI data on insurable earnings and premiums paid. As there is a "cutoff" point for UI premiums above which the premium rate remains the same – a maximum of $264 per week in 1979 – data on wages below this maximum reflect actual wages, while those above understate the actual amount. Consequently, in our data set, the dependent variable is truncated for those observations where the values are at, or above, the truncation level. Clearly, a technique that accounts for the truncation in the dependent variable would be more appropriate (Tobin, 1958).

We estimate equation 6.5 by means of ordinary least squares. For reasons stated earlier, we could not apply the maximum likelihood procedure here. The problem in using OLS is that it results in estimated coefficients that are systematically biased. The degree of bias increases with

Table 6-5

OLS Estimates[1] of the Change in the Average Weekly Wage of the ETCP Participants, One Year before and One Year after the Program

	Men	Women	Total
		(*t*-statistics)	
Coefficients of:			
Intercept	131.708	226.234	147.724
	(2.62)	(2.97)	(3.52)
Age	–0.151	–0.293	–0.235
	(0.57)	(0.69)	(1.05)
PEMP	18.398	0.751	15.652
	(2.36)	(0.07)	(2.47)
Urate	–0.875	–16.791	–3.560
	(0.14)	(1.77)	(0.68)
ETCP	–17.367	22.325	–8.741
	(2.45)	(1.91)	(1.44)
ETCP weeks	1.112	0.041	0.907
	(3.22)	(0.07)	(3.06)
Average ETCP effect	3.56[2]	23.20	9.04
	(0.26)[2]	(0.97)	(0.76)
		(Weeks)	
Mean of ETCP weeks	18.82	21.36	19.6

1 The estimation results for other variables (such as occupation, industry, province) are not presented in this table but are available from the author on request.
2 For calculation procedures, see notes to Table 6-3.

the severity of the truncation of the sample. In our case, the truncation problem may not be a source of serious bias since only 9 per cent of the sample had actually earned at least the maximum insured earnings.

The coefficient C_2 of *ETCP weeks* may be interpreted as the number of additional dollars that a participant earns by staying in the program an additional week. Once the parameters are estimated, the average effect of the program is obtained by evaluating equation 6.6 at the mean number of weeks the participant spent in the program. If the ETCP did increase the postprogram weekly wages of the participants, we would expect its average effect to be positive. The coefficients of *ETCP* and *ETCP weeks* and their *t*-ratios and presented in Table 6-5, along with the average effects.

The coefficient of the total ETCP effect is positive but not statistically significant in any of the cases estimated. This indicates that ETCP participation did not increase the weekly wages of the participants relative to those of members of the control group. That is not surprising, given the fact that ETCP participants had experienced substantial labour market difficulties before entering the program. For these long-term unemployed individuals, 19.6 weeks of program participation does not, on average, seem to be sufficient to leave any significant postprogram wage impacts. Moreover, ETCP participants were workers from the lower end of the wage distribution (Table 6-6), for whom very limited or virtually no wage advancement opportunities exist in the market in which they are participating (Gera and Hasan, 1982; Hasan and Gera, 1982).

Main Findings

The main findings concerning the impact of the ETCP on subsequent labour market performance are as follows. First, the program did not succeed in increasing the participants' future probability of employment. This is not surprising because participants (and, for that matter, the members of the control group) were not average members of the labour force, but rather workers who had experienced substantial labour market difficulties in the years prior to their entering the program. For example, their average duration of unemployment per completed spell during the period from 1975 to the program joining date was 24.2 weeks for men and 27.7 weeks for women, versus 16.6 and 19.6 weeks, respectively, for the average labour force during the period 1975-79.[6] Workers with special difficulties are more likely to enter a job creation program and, of course, it was just such long-term unemployed workers for whom the policy makers had targeted the program in the first place.

Table 6-6

Wage Distribution of the ETCP Sample and the Control Group, One Year before and One Year after the Program

	ETCP sample		Control group	
	One year before the ETCP	One year after the ETCP	One year before the ETCP	One year after the ETCP
	(Per cent)			
Wages ($):				
150 or less	33.33	43.72	32.13	37.69
151 to 200	23.43	21.83	20.25	20.13
Over 200	43.23	34.45	47.62	42.15

SOURCE Employment and Immigration Canada, sample ETCP file linked with the LFDB, 1975 to 1978/79, and estimates by the author.

Second, the program did have some effect on the total weeks of employment (per spell) of participants after the program. The results suggest that participants who stayed in the program longer had a slightly longer employment length (per spell) after the program. Strong positive average employment effects of the ETCP are found for both men and women, the effect being more significant for the latter.

Finally, program participation did not increase the weekly wages of participants at their next job(s). On average, a duration of 19.6 weeks of program participation did not seem to be sufficient to yield any significant subsequent wage effects. This can be explained by the fact that the ETCP participants were workers from the lower end of the wage distribution for whom few, if any, wage advancement opportunities exist.

7 Conclusions

In this study, after a brief review of employment subsidy policies implemented in several industrialized countries and a discussion of wage subsidies in general, we have focused on Canada's Employment Tax Credit Program. In our analysis we asked familiar questions, although the framework for answering them was less familiar. The main issues addressed were the following: First, do employment subsidy programs meet a strict economic-efficiency test in terms of social benefits and social costs? Do the benefits exceed the costs from a societal point of view? Second, what is the net job creation impact of these employment subsidy schemes after taking into consideration factors such as displacement and deadweight effects? Third, do these programs create jobs more cost-effectively than other employment measures such as public-service employment programs and jobs created through generalized government expenditure or income tax cuts? And finally, do such employment measures improve the postprogram productivity of the worker through their contribution to work experience or on-the-job training?

These questions were evaluated within the context of recent experience with the ETCP. The principal conclusions of our analysis may be summarized as follows:

- The ETCP can be considered a socially efficient program. The value of the output created under the program exceeded the social opportunity cost of the resources used, for all provinces. The net social benefit resulting from the creation of an ETCP job was very significant, amounting to about 60 per cent of the wage bill. The greatest benefit came from the creation of jobs in labour markets characterized by high unemployment rates, justifying the case for providing relatively higher rates of subsidy for high-unemployment provinces. This result supports job creation policies like the ETCP, which have differential subsidy rates, rather than policies that apply uniformly across provinces.

- The net employment creation impact of the program was low after taking into consideration displacement and deadweight factors. Our estimates show that only 20 per cent of the jobs reported as having been created by the ETCP represented incremental gains in employment. Of every five jobs subsidized under the program, only one represented a real increase in employment.

- The average cost per incremental work-year created by the ETCP was estimated to be $9,400. The cost appears to have been close to the net annual earnings of the new employees. These cost estimates depend, of course, upon the amount of displacement and deadweight that occurred. The estimates are biased upward to the extent that they do not take into consideration the increased tax revenues generated by the additional employment or the reduced transfer payments. Without making any allowance for these omissions in the analysis, the clear message is that the ETCP provided employment creation to the private sector at a lower budgetary cost than other job creation policies, despite the displacements, substitution, and windfalls to employers that accompanied it.

- The period for which data were available on the postprogram performance of program participants is too short to draw any firm conclusions, but our analysis nevertheless suggests that the ETCP did not increase the future probability of employment of participants. Nor do the results indicate that the program increased the weekly wages of the participants at their next job(s). There is some evidence to suggest that the program had a positive impact on the length of subsequent employment spells. In general, our impression is that the program did not succeed in improving the future employability of participants. This is not surprising, since the participants were not just from the lower end of the wage distribution, but were also workers who had had substantial labour market difficulties in the years prior to joining the program.

Our evaluation of the ETCP yields a mixed verdict. Overall, however, it should be viewed as a promising policy approach. Admittedly, the program did not increase the participants' labour market value in terms of enhancement of future employability or future earnings, nor did it really create as many jobs as it claimed. The performance of the program in these respects, though, was no worse than other direct job creation efforts; and, in some ways, it was better. The real strength of the program lay in creating jobs with high net social benefits. This efficiency case is reinforced by the usual equity argument for shifting demand towards unskilled workers.

A Bottom Line?

Our evaluation of the ETCP has brought forward some of the complexities and trade-offs involved in employment

subsidy programs. On a positive score, marginal-employment subsidies have many attractive features.

First, they are an appealing form of employment policy because of their directness and visibility, and because they can often act quickly to increase employment (this point was also raised by Donner and Kliman, 1985).

Second, marginal-employment subsidies also have the advantage of being politically attractive in the present environment, as they can be directed towards expanding production in the private sector. It is a well-recognized fact that government policies are not always motivated solely by economic criteria but also by political and social considerations.

Third, marginal-employment subsidies can offset the distortionary effects of other government policies in the labour market. For example, they can reduce the effects of minimum wage laws and other barriers to downward wage-rate flexibility. It is possible, in principle, to offset any disemployment effects of a minimum wage law by a wage subsidy of appropriate size.

Fourth, wage subsidies are flexible. They can be used in a variety of ways. The major variants of wage subsidies are general wage-bill subsidies and marginal-employment subsidies. A general wage-bill subsidy applies to the entire wage bill and therefore subsidizes intramarginal as well as incremental employment. A marginal-employment subsidy applies to the wage costs of incremental employment beyond a given base level. It is the latter form of subsidy that is of major interest, and it can be used in three important ways: marginal-stock subsidies, subsidies to avert or defer layoffs, and targeted recruitment subsidies. A recruitment subsidy is less attractive because it attaches to a particular worker rather than to employment above a specified base level and, consequently, induces employers to increase labour turnover. The recent Canadian ETCP was a subsidy scheme of a marginal-stock variety.

Fifth, marginal-employment subsidies can be used as a countercyclical device to increase or protect aggregate employment during a recession. Both redundancy-averting subsidies and marginal-stock subsidies can help to maintain or to increase the level of aggregate employment. It has been suggested, for example, that during periods of high unemployment, when the likelihood of unemployed workers finding jobs is greatly reduced, wage subsidies could be provided to firms faced with the prospect of layoffs. By spreading over time the release of excess workers into the job market, wage subsidies can help avoiding congestion in local labour markets due to rising layoffs (Parsons, 1980). It should be noted, however, that redundancy-averting schemes carry the risk of postponing desired structural adjustments on the part of both firms and workers; and marginal-stock subsidies favour expanding firms rather than weak and declining firms. On resource allocation grounds, then, marginal-stock subsidies are superior to redundancy-averting subsidies (OECD, 1982, p. 9).

Sixth, marginal-employment subsidies can serve a structural objective of promoting more equitable access to employment opportunities. They can be designed to increase the demand for the labour of specific groups experiencing high unemployment, or they can be targeted at regions that are hit by above-average structural unemployment. Recent experience has shown that employment subsidy measures do not provide a general subsidy that an eligible employer can apply to any employee or even to any low-skill worker that he employs. They are, instead, highly targeted at very specific socioeconomic groups. The Canadian ETCP and the U.S. New Jobs Tax Credit were exceptions to this, in that they were not targeted at any specific groups. It is important to note, however, that the ETCP, although not explicitly targeted at any unemployed group, was, by virtue of its being a fixed amount per eligible worker regardless of that worker's wage level, targeted, at least relatively, at low-wage workers.

Seventh, targeted marginal-employment subsidies can increase employment, in the short run, with lower inflationary pressures. In the long run, they can lower the nonaccelerating inflation rate of unemployment or the equilibrium unemployment potential of the economy. The existing evidence suggests that a targeted employment subsidy can achieve a 0.5 percentage point reduction in the unemployment rate without aggravating inflation (Haveman and Palmer, 1982, p. 14).

Eighth, employment subsidy programs can meet the strict economic-efficiency test in terms of cost-benefit calculations from a societal point of view. Our analysis showed that the ETCP was a socially efficient program.

Ninth, targeted employment subsidies play an important policy role by responding to equity considerations as well. By shifting the demand towards low-skill, low-wage workers, the income distribution objectives are met.

Finally, marginal-employment subsidies appear to be a more cost-effective policy to stimulate employment than other available instruments of job creation. The budget-deficit impact of employment subsidy policies appears to be very low; it is worth noting that, in principle, a budget-neutral version of an employment subsidy plan can be designed. The evidence from the ETCP shows that the tax

credits claimed under the program were low throughout its life. During the period 1978-84, tax credits totaling $93.6 million were claimed by participating firms.

There are, however, two major problems with employment subsidy policies. First, the net employment effect of such policies is generally not high because of their displacement and deadweight impacts. Our analysis of the ETCP supported this observation. Second, temporary employment subsidy programs generally do not provide on-the-job training or enhance the skills and future employability of participants. This was supported as well by our analysis of the program.

On balance, we suggest that well-designed, marginal-employment subsidies have an important role to play during periods of high unemployment. In particular, employment subsidies are most effective during the expansionary and contractionary phases of the business cycle. We do not wish to suggest, however, that employment subsidies are in any sense a panacea for the problems of the labour market. Nor are we suggesting that these subsidies have strong advantages over general demand-management policies. In our view, employment subsidies should complement, rather than replace, sound macroeconomic policies and selective labour market policies that affect the process of labour market adjustment and allocation. The issue, then, really becomes a matter of co-ordinating macroeconomic and microeconomic policies. The experience of the United Kingdom, however, does not provide encouraging results. Unemployment in the United Kingdom has risen dramatically since the 1970s. Observers argue that it has done so as a result of what has been called "the British experiment," whereby macroeconomic policies were directed towards controlling inflation, while microeconomic policies were designed to increase employment and improve the flexibility of labour markets.

Currently, Canadian unemployment rates remain stubbornly high. According to the most widely accepted estimates, demand-deficient unemployment accounts for about 4 per cent, while frictional, structural, and real-wage unemployment (if any) combined accounts for the remainder (Fortin, 1986). The highest unemployment rate is registered by young people in the 15-24 age group. Three additional facts stand out about the unemployed. First, there is a group of marginal workers who move into and out of jobs, sometimes several times a year, and who account for a significant proportion of total unemployment spells. Second, most unemployment spells are of short duration. Third, a significant fraction of total unemployment, while experienced by a small group of the unemployed, is accounted for by those in long-term unemployment. In its 1982 report, the Economic Council of Canada mentioned that "there are also strong indications that the extent of long-term unemployment is closely related to job availability in the economy" (p. 61).

In such circumstances, a program of well-designed, marginal-employment subsidies to the private sector targeted at the long-term unemployed and at other groups (especially youth), combined with sound macroeconomic and selective labour market policies, can contribute to reducing cyclical and structural unemployment without compounding inflation. Since such programs do not provide adequate on-the-job training and lead to more "dead-end" jobs, as the experience with the ETCP has shown, they can be combined with a required training component especially designed for young people. A recent Swedish employment subsidy scheme required that employers offer at least two months of training, with any additional costs to be covered by a subsidy. The recent report of the Royal Commission on the Economic Union and Development Prospects for Canada recommended a generalized job-apprenticeship program along the German lines through reinstatement of the ETCP, targeted specifically at youth. It was further recommended that "the program should also be made available on behalf of women entering the labour force for the first time and of those who are re-entering the work force, after dropping out for reasons of family responsibility" (1985, Vol. 2, p. 761).

The Commission also recommended limited use of a portable wage subsidy (involving subsidy vouchers to targeted workers, for example) as a component of the overall package of the Transitional Adjustment Assistance Program (TAAP). "Since TAAP beneficiaries might often have been without jobs for some time, and since most would probably belong to older age groups, they might often be at a competitive disadvantage in seeking employment. This advantage could be largely or entirely overcome by providing them with a portable wage subsidy" (1985, Vol. 2, p. 616).

Finally, the "enterprise zone" proposal has attracted some attention in the United States and Britain. Programs have been introduced in these countries to stimulate employment creation in depressed inner-city areas – where jobless rates are high – by setting up "special enterprise zones" that offer employment tax credit and other benefits to entrepreneurs. A recent study suggests that enterprise zones at the state level are faring well in the United States (Weiner, 1985).

General Lessons for Future Programs

What lessons can we learn regarding program design and effectiveness from the Canadian and U.S. experiences and

from the more extensive experience with employment subsidies in Western Europe? The problem is how to design a marginal-employment subsidy program that will provide maximum latitude in its use and will have the maximum net-employment effect and yet avoid a massive outflow of government funds. The Economic Council of Canada, in its report entitled *In Short Supply*, outlined a series of measures to improve the effectiveness of wage subsidy programs. The objective here is to outline some implications that follow from our analysis.

First, an important barrier that has kept participation in employment subsidy programs, such as the ETCP, at a relatively low level is lack of knowledge about the existence and rules of the programs and the initial costs of responding to them. In a recent study of U.S. wage subsidy programs, it was found that efforts by local program administrators to overcome this ignorance by personal contact with employers have a significant impact upon whether the employer is both familiar with, and willing to use, the targeted employment subsidies. By screening the workers for eligibility and helping employers locate and hire targeted workers, job service offices can substantially increase the rate of employer usage of these programs (Bishop and Montgomery, 1986).

Second, it is important to keep the program simple to reduce administrative costs, as well as to avoid multiple objectives and to place as little as possible of the administrative burden on the employer. Efforts should be made to reduce any potential conflict with government agencies.

Third, experience with wage subsidy programs shows that the majority of the schemes adopted so far contained a mixture of anticyclical and structural elements. The dual policy objective, in our opinion, complicates the effectiveness of the program. If the objective is to reduce cyclical unemployment, then an ETCP-type program that covers any unemployed worker would be the right approach. On the other hand, targeted programs can meet the structural objectives of improving the functioning of the labour market and reducing structural unemployment.

Fourth, very narrow socioeconomic targeting of these programs must be avoided. A narrow socioeconomic targeting approach lowers the likelihood that the subsidy program will achieve the desired effect of increasing the employment level of the target group. A recent survey in the United States showed that firms have strong preferences for less targeted programs (O'Neill, 1982). In the case of the ETCP, employers objected to the requirement that the newly hired workers had to have been previously unemployed for a period of at least eight weeks. As a result, the eight-weeks unemployment qualification period was reduced to two weeks. In our opinion, this problem can be overcome through higher rates of incentives and the efforts of local program administrators and job service offices, as argued earlier.

Fifth, some observers argue that wage subsidies in the form of a tax credit cannot affect the behaviour of firms that have no positive profits and therefore have insufficient tax liability. Such firms would be excluded from a tax credit scheme unless the tax credit were refundable. The ETCP attempted to mitigate this problem by allowing firms to carry all or part of the tax credit forward, up to a maximum of five years. A study of the New Jobs Tax Credit in the United States argued that the tax credit format diluted the effectiveness of the program because of the separation of the operations and finance functions in larger firms.

> The former, which include matters of pricing, output, and employment, were considered totally separate from the latter, which include matters of federal income taxation. Financial matters were thought to require the attention of a specialist and were therefore handled by the firm's accountant and/or chief financial officer. As specialists, however, the accountants and financial officers did not always appreciate the ramifications of the NJTC for pricing and employment policy. Consequently, they did not always inform other officers about the details of the credit or, in some cases, failed to inform other officers of the credit at all until the end of the taxable year (Tannenwald, 1982, p. 31).

In its 1982 report, the Economic Council suggested that the tax credit system was appealing because of its simplicity. A sharp distinction was drawn between the short-run/long-run dimension of the issue. That is, a temporary program to meet a short-term problem might well be based on the tax credit system. For a longer-run program, however, it was recommended that "the federal government take steps to put in place the administrative machinery necessary to establish a system involving a direct cash wage subsidy to private employers for the purpose of job creation" (p. 106).

Finally, do the employee-based employment subsidies provide an attractive alternative to employer-based subsidies? Employer subsidy programs (like the ETCP) operate on the demand side of the labour market, and subsidy payments are often restricted to new hirings or to firms that increase total employment. The worker is a passive participant who need not know if he is generating a subsidy; nor will his co-workers know. In the employee-based wage subsidy program aimed at increasing employment, the incentive operates through the supply side of the labour market. By raising the amount of labour supplied at presubsidy market wages, an employee-based subsidy can lower the market wages paid by employers and thus raise employment. In such a scheme, every targeted worker is

generally given a voucher indicating that any employer hiring the worker will be entitled to a subsidy of a designated form (for example, the Canadian Portable Wage Subsidy program). It has been suggested that, depending upon the specific causes of the target-group unemployment, employee-based wage subsidies may be more effective instruments for achieving employment increases for disadvantaged workers than employer-based subsidies (Lerman, 1982).

An employee-based subsidy scheme raises several questions. The major one is: Will the program be seen as a vehicle for stigmatizing participants as losers (Haveman, 1980; Haveman and Saks, 1985)? There is no Canadian evidence on this point. In a recent controlled experiment in the United States, designed to test the effectiveness of a targeted employee-based wage subsidy program, it was found that job seekers given experimental vouchers that identified them to employers as eligible for a generous wage subsidy were significantly less likely to find employment than were those without vouchers (Burtless, 1985). The author speculated that the vouchers had a stigmatizing effect and provided a screening device with which employers discriminated against economically disadvantaged workers.

To conclude, this study presents a considerable amount of new evidence regarding the economic effects of marginal-employment subsidies. Although the conclusions about postprogram effectiveness are less definitive than would be desired, the study has been able to provide evidence on major policy questions regarding those subsidies.

Appendix A

Table A-1

Inventory of Major Employment Subsidy Programs in Selected Industrial Countries, 1970-83

	Program	Objective	Eligible employees	Eligible employers	Subsidy	
					Amount	Length of time
Canada	Canada Manpower Industrial Training Program (introduced in 1974)	Recruitment and redundancy-averting; for on-the-job training.	Those employed through manpower centres.	Private employers.	Employer is reimbursed a percentage of his wage costs (varying from 40 to 85 per cent).	Up to 52 weeks.
	Job Experience Training Program (1977-79)	Incremental; employers agreed to consider participants for permanent employment at the end of the training period.	Those under 25 years of age registered as unemployed for at least three months and with little prospects of finding regular employment.	Private employers.	50 per cent of hourly wage up to $1.50, subject to a maximum of $1,560 per employee.	26 weeks.
	Employment Tax Credit Program (introduced in 1978)	Incremental.	Persons registered as unemployed for at least two weeks.	Private employers; any business except temporary work agencies and firms in existence less than six months.	Tax credit to firms, ranging from $1.50 to $2.00 an hour, depending on the region; taxable, with a pretax value per person of $4,160.	12 months.
	New Technology Employment Program (implemented in 1980)	Recruitment; research and development.	Highly educated graduates in scientific and technical fields who cannot find employment in their disciplines.	Private sector firms that normally employ fewer than 300 employees; research institutes; non-profit Crown corporations; universities and community colleges; individuals in single proprietorships; associations and community organizations.	75 per cent of wages for each eligible employee; maximum contribution of $290 a week per job.	Maximum of 12 months.
	Portable Wage Subsidy (introduced in March 1981)	Recruitment; designated ...eas and/or industries; labour adjustment.	Displaced workers 45 years old and over; worker must have a two-year attachment to a firm within an industry and community designated under the	Private employers.	$2.00 per participant per hour to a maximum of 40 hours per week; eligible participants are given wage subsidy vouchers.	Up to 12 months.

Table A-1 (cont'd.)

	Program	Objective	Eligible employees	Eligible employers	Subsidy	
					Amount	Length of time
			Industrial and Labour Adjustment Program or to a firm covered by a Manpower Consultative Service agreement.			
	Program for the Employment-Disadvantaged (launched in May 1981)	Recruitment; to develop human resource potential of employment for disadvantaged Canadians.	Physically and mentally handicapped persons and other unemployed persons who have experienced serious difficulties in securing and keeping employment.	Private employers.	85 per cent of gross wages, decreasing progressively to 50 and 25 per cent.	Total of 65 weeks for handicapped workers and 39 weeks for other employment-disadvantaged workers.
	Career-Access (introduced in September 1983)	Recruitment.	The inexperienced, the disabled, and others facing barriers to employment; older workers identified by the Industrial and Labour Adjustment Program, the Canada Industrial Renewal Program, and the Manpower Consultative Service; students in work-study situations.	Businesses, organizations, or individuals in business for six months or more; municipalities, and federal departments and agencies for students returning to school.	85 per cent of employer's gross wages to a maximum of $500 per week; the maximum wage contribution per employee is $15,000.	Up to 12 months.
United States	Job Opportunities in the Business Sector (1968-73)	Recruitment.	Disadvantaged, unemployed workers.	Private employers.		
	WIN-Welfare Tax Credit Program (introduced permanently in 1971)	Recruitment; employer must retain employee for at least 30 consecutive days.	Public-assistance recipients.	Private employers.	Employer receives a tax credit equal to 50 per cent of the first year's wages (up to $6,000) and to 25 per cent of the second year's wages (up to $6,000); credit of 35 per cent of first $6,000 for employers of nonbusiness (household) employees.	Two years (one year for household employees).
	Earned Income Tax Credit (introduced in 1974)	Recruitment.	Low-income worker supporting children under 18 years old.	Public and private employers.	Worker receives 10 per cent of first $4,000 of earnings.	

Table A-1 (cont'd.)

	Program	Objective	Eligible employees	Eligible employers	Subsidy	
					Amount	Length of time
	New Jobs Tax Credit (1977-78)	Incremental; applied to increases above 102 per cent of previous year's wage base.	No restrictions.	Private employers.	Employer receives a tax credit equal to 50 per cent of the first $4,200 paid to each additional worker; 60 per cent for handicapped workers.	One year.
	Youth Incentive Entitlement Pilot Projects (1978-80)	Recruitment.	Economically disadvantaged youth, 16 to 19 years old.	Private and public employers; 17 designated areas in which the entitlement project is established.	100 per cent wage subsidy; experimental program guaranteeing youth a part-time job during school year and a full-time job in the summer.	Variable.
	Targeted Jobs Tax Credit (introduced in 1979)	Recruitment; however, restrictions to limit the displacement of nontargeted workers.	Public-assistance recipients, the handicapped, Vietnam veterans, youth.	Private employers.	Employer receives a tax credit equal to 50 per cent of the first year's wages (up to $6,000) and to 25 per cent of the second year's wages (up to $6,000).	Two years.
	Summer Targeted Jobs Tax Credit (introduced in 1983)	Recruitment; for summer employment.	Economically disadvantaged youth, aged 16 and 17.	Private employers.	Employer receives a tax credit equal to 85 per cent of wages (up to $3,000).	Summer.
United Kingdom	Recruitment Subsidy for School Leavers (1975-76)	Recruitment.	School leavers under 20 years old with not more than six weeks of work experience.	Private employers.	Employer receives £5 a week per worker.	Six months.
	Temporary Employment Subsidy (1975-79)	Redundancy-averting.	No restrictions.	Private employers; initially in assisted areas, later this restriction was removed; a minimum of 10 workers must be threatened with redundancy.	Firm receives £20 per week for first 12 months (equivalent to 30 to 40 per cent of average manufacturing labour costs); £10 per week for additional six months.	18 months.
	Youth Employment Subsidy (1976-78)	Recruitment.	Persons under 20 years old registered as unemployed for at least six months.	Private employers and nationalized industries.	Firm receives £10 per worker per week.	26 weeks.
	Small Firms Employment Subsidy (1977-80)	Incremental.	No restrictions.	Private employers; manufacturing firms with less	Firm receives £20 per week (equivalent to 30 per cent	26 weeks.

Table A-1 (cont'd.)

Program	Objective	Eligible employees	Eligible employers	Subsidy	
				Amount	Length of time
			than 50 employees in "assisted areas"; later extended to firms with up to 200 employees.	of average manufacturing wage).	
Adult Employment Subsidy (1978-79)	Recruitment.	Adult workers unemployed for at least 12 months.	Private employers.	Employer receives £20 per week.	26 weeks.
Short-Time Working Compensation Scheme (1978-79)	Redundancy-averting by encouraging work sharing.	No restrictions.	Textile, clothing, and footwear industries.	75 per cent of a worker's normal pay plus related national insurance contributions.	Not specified.
Youth Opportunities Program (1978-82)	Recruitment.	Unemployed youth, with priority to school leavers.	Public and private employers.	Young person receives £25 a week, tax-free; sponsor is paid for administration and some overheads.	One year.
Temporary Short-Time Working Compensation Scheme (1979-84)	Redundancy-averting by encouraging work sharing.	Workers between 19 and 24 years old unemployed for six months and older workers unemployed for 12 months.	Private employers.	Employees must receive 75 per cent of their normal pay for days without work, for which employers are reimbursed one-half, including half of the national insurance contributions; for applications received after November 1980, subsidy was reduced to 50 per cent.	6 to 12 months (depending on the date the application was received).
Young Workers' Scheme (introduced in 1982)	Recruitment.	Young workers under 18 years of age.	Private employers.	Employer receives £15 a week for workers with gross earnings below £40 a week; £7.50 for workers with gross earnings of £40 to £45 a week.	12 months.
Youth Training Scheme (introduced in 1983)	Provision of work-related training.	Young people.	Private employers.	Employer receives £1,950 per trainee.	12 months.
Job Splitting Scheme (introduced in 1983)	Recruitment or redundancy-averting; splitting of job can result in recruitment of unemployed person or prevent	Unemployed worker or employee facing redundancy.	Private employers.	Grant of £750 paid to employer per split job.	

Table A.1 (cont'd.)

	Program	Objective	Eligible employees	Eligible employers	Subsidy	
					Amount	Length of time
		employee from becoming redundant.				
Japan	Japan Employment Adjustment Subsidy (initiated in 1975)	Redundancy-averting.	No restrictions.	Private employers; firms in designated industries paying layoff allowance or offering training during periods of production adjustment or business conversions.	Half of layoff allowance or wages (two-thirds in the case of small and medium-sized enterprises) plus some portion of training expenses where applicable.	200 days.
	Japan Subsidy for Employment Creation for Middle-Aged or Old Persons (initiated in 1977, expanded in 1979)	Recruitment; employers must increase either the number or the ratio of older workers.	Middle-aged or older workers (between the ages of 45 and 65).	Private employers.	Three-fifths of the wages of the middle-aged or older workers (one-half for the last six months); four-fifths in the case of small and medium-sized enterprises (two-thirds for the last six months).	12 months for workers between 45 and 55 years old; 18 months for workers between 55 and 65 years old.
	Japan Subsidy for Employment Creation in Selected Depressed Industries (initiated in 1978)	Recruitment; employers must provide regular jobs plus education and training.	Workers displaced from selected depressed industries; presently 39 industries, including shipbuilding, are designated as depressed.	Private employers.	Half of wages (two-thirds in the case of small and medium-sized enterprises) plus a specific amount of the actual training cost.	Six months.
	Japan Subsidy for Employment Creation in Selected Depressed Areas (initiated in 1978)	Recruitment; employer must use public employment security office.	Unemployed aged 35 and over.	Private employers; firms in designated depressed areas.	Y15,000 per worker per month.	12 months.

SOURCE United Nations (1984); OECD (1982); Haveman and Christiansen (1978); Employment and Immigration Canada, *Annual Report*, various years.

Appendix B

Measuring the Social Opportunity Cost of Temporary Employment

This appendix describes the model employed in Chapter 4 to derive the expression for the social opportunity cost of a job created through the Employment Tax Credit Program.

The Basic Model

1 The model can be considered as a two-sector model of a region or a geographical market. Sector I (the permanent sector) employs L_1 skilled workers and $\overline{K}_1$ units of nonaugmental factors (for example, natural resource endowments) specific to that sector, and sector II (the temporary sector) employs N_2 unskilled workers along with a fixed supply of the nonaugmental factors, $\overline{K}_2$. Each sector produces a different good. We assume that both sectors are competitive. In making these Ricardian-type production assumptions we are abstracting from capital as an input into production processes. We are implicitly assuming that capital is perfectly mobile between sectors and allocated with efficiency.

2 The region under consideration is assumed to be small and faces fixed output prices due to international trade.

3 In the permanent sector, the wage rate is determined by market prices to equate labour demand and supply. The wage rate in the temporary sector is assumed fixed at a level above the full-employment equilibrium. The minimum floor to this wage is assumed to be determined by minimum wage laws. This results in unemployment in the temporary sector.

4 For simplicity, we assume that the workers' utility is linearly related to the expected value of wages and the value of leisure or nonmarket time. Thus, in the permanent sector (where full employment exists) utility depends only on the wage rate. In the temporary sector, expected utility is a weighted average of the wage rate and the value of leisure or nonmarket time. Each worker is assumed to have the same probability of securing employment so that the weights are respectively the probability of being employed and being unemployed. In the temporary sector, workers are assumed to work for fixed hours and there is no trade-off between hours worked and productive home time or leisure. It is also assumed that the wage ($\overline{W}_2$) in the temporary sector is higher than the value of nonmarket time (h), so that unskilled labour would prefer work at $\overline{W}_2$ to leisure. The workers in the temporary labour market are all identical and all have homothetic tastes. The jobs are allocated on a random selection basis; that is, all workers have an equal probability of obtaining the existing jobs. Then, the probability of being unemployed is the unemployment rate itself. Unemployment is determined by the difference between employment, N_2, and the supply of labour, L_2, in the temporary sector.

5 In the spirit of the Harris and Todaro (1970) analysis, it is assumed that labour is risk-neutral and will acquire skills as long as the utility of the skilled labour minus the cost of acquiring skills exceeds the expected utility in the temporary sector. Thus mobility between sectors is the equilibrating mechanism. In order to move to the permanent sector from the temporary sector, workers have to acquire skills at their own cost.

6 In each time period, labour retires at a natural rate (δ) from both sectors. Further, we assume that the labour force experiences new entries at the same rate (δ) in each time period. All new entrants are assumed to be unskilled. These assumptions ensure that the size of the total labour endowment ($\overline{L}$) in each time period does not shrink and that, in the absence of movement of unskilled workers, the proportion of unskilled workers in the work force will grow. The length of calendar time defined as "period" in the model is arbitrary. The period structure in the model works in the following manner. At the beginning of any period, new entry and retirement take place. During the period, labour moves in response to expected utility differences between sectors. The end of the period then shows the equilibrium values for that period. At the beginning of the next period, the initial endowment of labour will consist of the equilibrium allocations of the previous period (i.e., the ending values of the previous period) plus the natural retirement/growth in the labour force.

7 For simplicity, it is assumed that the cost of acquiring skills is pecuniary and involves no time loss.

8 Unless specified otherwise, it is assumed that there are no transfers (e.g., unemployment insurance benefits) in the model.

The following equations constitute the complete model.

The Permanent Sector Production Function

$$X_1 = f_1\left(L_1, \bar{K}_1\right),$$

$$f_1' > 0; f_1'' < 0. \tag{B.1}$$

The Temporary Sector Production Function

$$X_2 = f_2\left(N_2, \bar{K}_2\right),$$

$$f_2' > 0; f_2'' < 0. \tag{B.2}$$

where

X_1 = the output of the permanent sector using skilled labour;
X_2 = the output of the temporary sector using unskilled labour;
L_1 = the skilled labour used to produce X_1;
N_2 = the unskilled labour used to produce X_2;
$\bar{K}_1$ = the nonaugmental factors specific to the permanent sector;
$\bar{K}_2$ = the nonaugmental factors specific to the temporary sector;
f_1' and f_1'' = the first and second derivatives of f_1 with respect to L_1 (f_{L1}' and f_{L1}''); and
f_2' and f_2'' = the first and second derivatives of f_2 with respect to N_2 (f_{N2}' and f_{N2}'').

Equations B.1 and B.2 specify the production functions f_i ($i = 1, 2$), which are assumed to exhibit the usual neoclassical properties.

Labour Endowment

$$L_1 + L_2 = \bar{L}. \tag{B.3}$$

There is a labour constraint which states that the sum of skilled workers actually employed in the permanent sector (L_1) plus the unskilled labour force (L_2) must equal the total labour endowment ($\bar{L}$).

Wage Determination

Skilled-Labour Wage

$$W_1 = P_1 \cdot f_1', \tag{B.4a}$$

where W_1, the skilled-labour wage, is equal to the value of the skilled-labour marginal product in the permanent sector, and P_1 is the price of the permanent sector output, X_1.

Unskilled-Labour Wage

$$W_2 = P_2 \cdot f_2'' = \bar{W}_2. \tag{B.5a}$$

The wage in the temporary sector is equated with the value of the marginal product of labour in that sector because of profit maximization on the part of perfectly competitive producers. However, this wage is constrained to be equal to a fixed wage above the full-employment equilibrium. It is assumed that there is never an excess demand for labour at the fixed wage, $\bar{W}_2$. P_2 is the price of the temporary sector output, X_2.

For simplicity, we normalize outputs so that these output prices are equal to unity (i.e., $P_1 = P_2 = 1$). Therefore, W_1 is the real wage of skilled labour, and $\bar{W}_2$ is the fixed real wage of unskilled labour. Thus, we can rewrite equations B.4a and B.5a as

$$W_1 = f_1', \tag{B.4}$$

$$\bar{W}_2 = f_2'. \tag{B.5}$$

Utility

$$U_1 = W_1, \tag{B.6}$$

where U_1 is the utility of an already skilled worker in the permanent sector and equals W_1 based on assumption B.4. The expected utility of an unskilled worker in the temporary sector is given by

$$E(U_2) = \Pi \bar{W}_2 + (1 - \Pi)h,$$

$$\Pi = \frac{N_2}{L_2} < 1, \tag{B.7}$$

where

$E(U)_2$ = the expected utility of an unskilled worker in the temporary sector;
Π = the probability of employment (or the proportion of time a worker is employed) in the temporary sector; this is equal to N_2/L_2 (unskilled employment in the temporary sector divided by the unskilled labour force);

$(1 - \Pi)$ = the probability of unemployment in the temporary sector $(1 - N_2/L_2)$; and
h = the value of nonmarket or leisure time.

The expected utility of an unskilled worker in the temporary sector, $E(U_2)$, is equal to the level of income when employed, $\Pi\bar{W}_2$, plus the value of leisure time when he(she) is unemployed, $(1 - \Pi)h$. Only in the case of full employment in the temporary sector (i.e., $\Pi = 1$ or $N_2 = L_2$) is the expected utility equal to the minimum wage (i.e., $E(U_2) = \bar{W}_2$).

The Long-Run Equilibrium Condition

$$U_1 = E(U_2) + C, \tag{B.8a}$$

or

$$f_1' - C = \Pi\bar{W}_2 + (1 - \Pi)h, \tag{B.8}$$

where C is the privately borne cost of acquiring skills for an unskilled worker. Equation B.8, a long-run equilibrium condition, is derived from the hypothesis that workers in the temporary sector will become skilled and move to the permanent sector, as long as the utility of the skilled labour (net of the cost of acquiring skills) exceeds the expected utility in the temporary sector. Clearly, then, in the long-run equilibrium the movement from the temporary to the permanent sector will cease when the expected utility to the (unskilled) worker from both sectors is equalized. Thus, in our model, movement between the sectors is a short-run or disequilibrium phenomenon. In long-run equilibrium, mobility ceases.

The equilibrium condition then is from the point of view of the unskilled worker whose decisions drive the model. It is his(her) choice to stay unskilled and get $E(U_2) = \Pi\bar{W}_2 + (1 - \Pi)h$ or become skilled and earn $U_1 = (W_1 - C)$. It is assumed that C is fixed and irreversible, that is, a "sunk cost." Once skilled, the worker's choice is to stay in the permanent sector and get W_1 or move to the temporary sector and get $\Pi\bar{W}_2 + (1 - \Pi)h$.

Thus we have eight equations and eight unknowns, X_1, X_2, L_1, L_2, N_2, W_1, U_1, and U_2. Given the values of $\bar{L}$, $\bar{W}_2$, h, and C, we can solve the unknowns. Equation B.8 determines the allocation of labour between the two sectors, given the technological assumptions that are made.

This model is a long-run equilibrium model, with endogenous mobility and skill acquisition.

The short-run model is assumed to operate in the following manner. Through time, the labour force in the economy allocates itself between the two sectors, until the expected utility (net of skill-acquiring costs) is equalized between the sectors. For example, if there were an increase in the supply of unskilled labour, movement to the permanent sector would continue until the long-run equilibrium condition (equation B.8) is satisfied. The reverse movement (that is, the movement of skilled labour to the temporary sector) may occur if there is a situation where $W_1 < \Pi\bar{W}_2 + (1 - \Pi)h$. This case is assumed to require only one time period. The skilled workers, however, may not necessarily move from the permanent to the temporary sector. In this case then, time is required for the accumulation of unskilled workers to restore equality. Once the long-run equilibrium solution is reached, the implicit movement between periods caused by the retirement of the skilled labour force creates an expected utility difference, at the beginning of each period, that is just sufficient to induce enough movement to keep the labour force in the permanent sector constant. That is, the long-run equilibrium will be characterized by condition B.8, $[W_1 - C = \Pi\bar{W}_2 + (1 - \Pi)h]$, together with the explicit or induced movement of δL_1^* per period, where δ = the rate of retirement in the labour force, and L_1^* = the initial long-run equilibrium quantity of the skilled labour.

Consider the following example: suppose that the initial long-run equilibrium values are as shown in Table B-1. At the beginning of the first period, the retirement in the labour force reduces L_1 by δL_1^*, which is equal to 300, assuming $\delta = 0.01$. L_2 increases by 300 to keep $\bar{L}$ constant. This reduces Π from 0.8 to 0.788, and the expected utility $E(U_2)$ decreases to \$146.68 from an initial equilibrium value of \$148. The production function in the permanent sector, which is assumed, for example, to be of the type $X_1 = AL_1^{0.6}\bar{K}_1^{0.4}$, suggests that a 1 per cent reduction in L_1 increases W_1 by 0.4 per cent. Therefore, at the beginning of the first period, U_1 or W_1 = \$158.63 and $E(U_2)$ = \$146.68. The difference between $[U_1 - E(U_2)]$ is greater than C (which is assumed to be \$10), so the induced or explicit movement begins. By the end of the first period, 300 workers move from the temporary to the permanent sector, where the long-run equilibrium condition again holds. Compared with the intial long-run equilibrium, nothing has changed except that an equilibrium movement of δL_1^* has taken place.

Direct Job Creation in the Temporary Sector

Direct job creation measures – either through public-service employment policy or employment subsidies – directly reduce the cost of hiring additional labour as

Table B-1

The Characteristics of Movement in the Labour Force: Retirement and Entry

			First period	
		Initial long-run equilibrium situation	Beginning of the period	End of the period
			(Number)	
1	Total labour force ($\bar{L}$)	50,000*	50,000	50,000*
2	Skilled labour force/jobs (L_1)	30,000*	29,700	30,000*
3	Unskilled labour force (L_2)	20,000*	20,300	20,000*
4	Unskilled jobs (N_2)	16,000*	16,000	16,000*
			(Per cent)	
5	Π	0.8*	0.788	0.8*
6	Unemployment rate in unskilled sector	20.0*	21.2	20.0*
			(Dollars)	
7	$E(U_2) = \Pi \overline{W}_2 + (1 - \Pi)h$	148.00*	146.68	148.00*
8	U_1 or W_1	158.00*	158.63	158.00*
9	$U_1 - E(U_2)$	10.00*	11.95	10.00*
10	$U_1 - E(U_2) \gtrless C, C = \$10$	$= C$*	$> C$	$= C$*
			(Number)	
11	Induced or explicit movement from temporary to permanent sector to maintain $U_1 - E(U_2) = C$	–	–	300*

Note The calculations are based on the following values: $\overline{W}_2 = \$170$; $h = \$60$; $C = \$10$; and $\delta = 0.01$. The values of U_1 or W_1 are derived from the following production function: $X_1 = A L_1^{\alpha} \bar{K}_1^{\beta}$, where $\alpha = 0.6$; $\beta = 0.4$; and $(\alpha + \beta) = 1$. The marginal productivity condition, $W_1 = 0.6 A L_1^{-0.4} \bar{K}_1^{0.4}$, suggests that a 1 per cent reduction in L_1 increases W_1 by 0.4 per cent.

perceived by potential employers. Indeed, in the case of public-service employment, a 100 per cent subsidy of the wages of workers in the temporary sector is provided, driving the cost of hiring additional such workers to zero. In this study, our interest lies mainly in examining the implications of a direct job creation policy in the temporary sector. It is not of much relevance to us as to which direct employment policy is implemented in creating jobs in the temporary sector. Throughout our analysis, therefore, it is assumed that a wage subsidy is an instrument chosen for the purpose of creating a targeted number of jobs in the temporary sector.

To see the dynamic effects of job creation in the temporary sector, consider the following example: suppose that the values in the first column of Table B-2 characterize the initial long-run equilibrium situation. At the beginning of period 1, the retirement in the labour force reduces the labour supply of skilled labour by 1 per cent ($\delta = 0.01$). To keep the total endowment of labour constant at 50,000, the size of the unskilled labour force increases by δL_1. At the same time, suppose that 1,500 jobs are created in the temporary sector. As is shown in row 6 of the table, the unemployment rate, $(1 - \Pi)$, which was 20 per cent in the initial long-run equilibrium situation, is lowered to 13 per cent. This raises the expected utility in the temporary sector from \$148.00 to \$155.70. At the same time, the reduction in L_1 due to retirement increases wages in the permanent sector from \$158.00 to \$158.63. Since the differential between U_1 and $E(U_2)$ is less than C (\$10), no movement of unskilled labour is induced. The distribution of the labour force between sectors at the end of the first period is exactly the same as at the beginning of the period.

At the beginning of the second period, due to retirement and entry, W_1 increases and $E(U_2)$ decreases as the unemployment rate, $(1 - \Pi)$, increases. The differential between U_1 and $E(U_2)$ is still less than C. No movement of unskilled

Table B-2

The Short-Run and Long-Run Implications of the Creation of 1,500 Jobs in the Temporary Sector

		Initial long-run equilibrium situation	Period 1		Period 2		Period 3		Period 4		Period 5		Period 6	
			b	e	b	e	b	e	b	e	b	e	b	e
								(Number)						
1	Total labour force ($\bar{L}$)	50,000*	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000**	50,000	50,000**
2	Skilled labour force/jobs (L_1)	30,000*	29,700	29,700	29,403	29,403	29,109	29,109	28,818	28,818	28,530	28,750**	28,462	28,750**
3	Unskilled labour force (L_2)	20,000*	20,300	20,300	20,597	20,597	20,891	20,891	21,182	21,182	21,470	21,250**	21,538	21,250**
4	Unskilled jobs (N_2)	16,000*	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500**	17,500	17,500**
								(Per cent)						
5	Π	0.8*	0.87	0.87	0.85	0.85	0.84	0.84	0.83	0.83	0.815	0.824**	0.813	0.824**
6	Unemployment rate in unskilled sector ($1 - \Pi$)	20.0*	13.0	13.0	15.0	15.0	16.0	16.0	17.0	17.0	18.5	17.6**	18.7	17.6**
								(Dollars)						
7	$E(U_2) = \Pi \bar{W}_2 + (1 - \Pi)h$	148.00*	155.70	155.70	153.50	153.50	152.40	152.40	151.90	151.90	149.65	150.69**	149.43	150.69**
8	U_1 or W_1	158.00*	158.63	158.63	159.27	159.27	159.50	159.50	160.54	160.54	161.19	160.69**	161.33	160.69**
9	$U_1 - E(U_2)$	10.00*	2.93	2.93	5.77	5.77	7.50	7.50	8.64	8.64	11.54	10.00**	11.90	10.00**
10	$U_1 - E(U_2) \gtrless C, C = \$10$	$= C$*	$< C$	$< C$	$< C$	$< C$	$< C$	$< C$	$< C$	$< C$	$> C$	$= C$**	$> C$	$= C$**
								(Number)						
11	Number of workers who will move from temporary to permanent sector during the period to maintain $U_1 - E(U_2) = C$	–*	–	–	–	–	–	–	–	–	–	220**	–	283**

* Denotes initial long-run equilibrium values.
** Denotes new long-run equilibrium values.
b Stands for beginning of the period.
e Stands for the end of the period.
Note The calculations are based on the following values: $\bar{W}_2 = \$170$; $h = \$60$; and $C = \$10$. The values of U_1 or W_1 are derived from the following production function: $X_1 = A L_1^{\alpha} K_1^{\beta}$, where $\alpha = 0.6$; $\beta = 0.4$; and $(\alpha + \beta) = 1$. The marginal productivity condition, $W_1 = 0.6 A L_1^{-0.4} K_1^{0.4}$, suggests that a 1 per cent reduction in L_1 increases W_1 by 0.4 per cent.

labour is induced. The situation at the end of period 2 is unchanged relative to that at the beginning of the period. The process continues until the beginning of period 5, when the differential between U_1 and $E(U_2)$ equals $11.54, which is greater than C ($10). This induces movement from the temporary to the permanent sector, until $U_1 - E(U_2) = C$ holds again. During that period, 220 workers move to the permanent sector and a new long-run equilibrium is established. The unemployment rate in the temporary sector in this new situation is lower than its previous long-run equilibrium level. To confirm that this is a long-run equilibrium, we carry out the analysis for one additional period. At the beginning of the next period (period 6, in our example) the movement in the labour force because of retirement and entry creates an expected utility difference of $11.90 between the sectors. Because this differential exceeds the cost of training to the unskilled worker, movement begins from the temporary to the permanent sector. As the skilled labour force increases, wages start to decrease in the permanent sector, and $E(U_2)$ begins to increase in the temporary sector. This process continues until $U_1 - E(U_2) = C$ holds again. By the end of this period, 283 workers migrate. That number is just sufficient to keep the size of the skilled labour force constant.

It can be seen from row 6 of Table B-2 that the unemployment rate in the temporary sector ($1 - \Pi$) in the new long-run equilibrium (17.6 per cent) is lower than its initial equilibrium value (20 per cent), due to the introduction of 1,500 unskilled jobs.

An interesting question is: What happens to the unemployment rate of the region? We find this out in the following way:

$$Urate_R^* = a^* Urate_{us}^* + b^* Urate_s^*,$$

$$a + b = 1,$$

where $Urate_R$ is the regional unemployment rate and the superscript (*) denotes the initial equilibrium value; $Urate_{us}^*$ is the temporary sector unemployment rate; $Urate_s^*$ is the permanent sector unemployment rate; and a and b denote the relative weight or size of the sector, respectively. In the example discussed in Table B-2, a = 0.4 (i.e., 20,000/50,000); b = 0.6 (i.e., 30,000/50,000); $Urate_{us}^*$ = 20 per cent; and $Urate_s^*$ = 0 per cent. Therefore, $Urate_R^*$ = 8 per cent. After the introduction of 1,500 unskilled jobs, the new long-run equilibrium value of $Urate^{**}$ is 7.5 per cent, $Urate_{us}^{**}$ is 17.6 per cent, and that of $Urate_s^{**}$ is 0 per cent, where the superscript (**) denotes the new long-run equilibrium value. Based on our example, this calculation suggests two important points: first, the introduction of a job creation program in the unskilled sector reduces the regional unemployment rate in the new equilibrium; and, second, the temporary sector grows and the permanent sector shrinks as a result of this program (as $a^{**} > a^*$, and $b^{**} < b^*$).

Appendix C

Table C-1

Guide to Variable Mnemonics

Sex	Male = 1, female = 0.
Age	Age of an individual in years at the beginning of 1975.
PEMP	Proportion of labour force time spent in employment from 1975 till the beginning of the estimation period.
Urate	National unemployment rate.
ETCP	ETCP participant = 1, otherwise = 0 (control group).
ETCP WKS	Number of weeks spent in the ETCP.
ΔPE	Change in the probability of employment between ETCP participants and control group members, one year before and one year after the ETCP.
$EWKS_t$	Total weeks of employment per completed spell (at time t).
$EWKS_{t-1}$	Total weeks of employment in the previous spell (at time $t-1$).
W_t	Average weekly wage at time t (in the current employment spell).
W_{t-1}	Average weekly wages at time $t-1$ (in the previous employment spell).
WB	Replacement ratio (average weekly UI benefits/average weekly wage).
Π	Proportion of labour force time employed.
Occupation	
OCC1	Managerial and professional = 1, otherwise = 0.
OCC2	Clerical and related occupations = 1, otherwise = 0.
OCC3	Sales = 1, otherwise = 0.
OCC4	Services = 1, otherwise = 0.
OCC5	Processing = 1, otherwise = 0.
OCC6	Machining and related occupations = 1, otherwise = 0.
OCC7	Product fabricating, assembling, repairs = 1, otherwise = 0.
OCC8	Construction trades = 1, otherwise = 0.
OCC9	Transport equipment operating = 1, otherwise = 0.
OCC10	Material-handling and related occupations (nec) = 1, otherwise = 0.
OCC11	Other crafts and equipment operating = 1, otherwise = 0.
OCC12	Primary occupations – missing category in regressions (includes farmers and farm workers; fishermen, trappers, and hunters; loggers and related workers; miners, quarrymen, and related workers).

Table C-1 (concl'd.)

Province	
NFLD	Newfoundland = 1, otherwise = 0.
PEI	Prince Edward Island = 1, otherwise = 0.
NS	Nova Scotia = 1, otherwise = 0.
NB	New Brunswick = 1, otherwise = 0.
QUE	Quebec = 1, otherwise = 0.
ONT	Ontario = 1, otherwise = 0.
MAN	Manitoba = 1, otherwise = 0.
SASK	Saskatchewan = 1, otherwise = 0.
BC	British Columbia = 1, otherwise = 0 (includes the Yukon).
Missing category in regressions	Alberta (includes the Northwest Territories)
Industry	
IND1	Mines, quarries, and oil wells = 1, otherwise = 0.
IND2	Manufacturing = 1, otherwise = 0.
IND3	Construction = 1, otherwise = 0.
IND4	Transportation, communication, and other utilities = 1, otherwise = 0.
IND5	Trade (retail and wholesale) = 1, otherwise = 0.
IND6	Finance, insurance, and real estate = 1, otherwise = 0.
IND7	Community, business, and personal services = 1, otherwise = 0.
IND8	Public administration = 1, otherwise = 0.
IND9	Primary industries (farming, forestry, and fishing) – missing category in regressions.

Table C-2

Calculation of Variables Used in Table 6-2

$$\Pi = \frac{1}{T} \left(\sum_{i=1}^{T} \frac{\text{(Total weeks of employment from 1975 till ETCP joining date)}_i}{\text{(Total weeks in the labour force from 1975 till ETCP joining date)}_i} \right)$$

$$(1 - \Pi) = 1 - \frac{1}{T} \left(\sum_{i=1}^{T} \frac{\text{(Total weeks of unemployment from 1975 till ETCP joining date)}_i}{\text{(Total weeks in the labour force from 1975 till ETCP joining date)}_i} \right)$$

$$ADU = \frac{1}{T} \left(\sum_{i=1}^{T} \text{(Total weeks of unemployment from 1975 till ETCP joining date)}_i \right)$$

$$ALU_s = \frac{1}{\sum_{i=1}^{T} N} \left(\sum_{i=1}^{T} \text{(Total weeks of unemployment from 1975 till ETCP joining date)}_i \right)$$

$$n = \frac{1}{T} \sum_{i=1}^{T} N$$

$$ALE_s = \frac{1}{\sum_{i=1}^{T} M} \left(\sum_{i=1}^{T} \text{(Total weeks of employment from 1975 till ETCP joining date)}_i \right)$$

$$m = \frac{1}{T} \sum_{i=1}^{T} M$$

$$d = \frac{1}{T} \left(\sum_{i=1}^{T} \frac{\text{(Total weeks UI benefits received from 1975 till ETCP joining date)}_i}{\text{(Total weeks of unemployment from 1975 till ETCP joining date)}_i} \right)$$

N = Total number of spells of unemployment per individual i.
i = Number of individuals ($i = 1, 2, \ldots, T$).
M = Total number of spells of employment per individual i.

Notes

Chapter 1

1 For an interesting inventory and a discussion of labour market programs and institutions, see Smith (1983). For a macroeconomic evaluation of some of these direct employment creation programs, see Cook et al. (1976) and Roy (1984).

2 In this study the terms "wage subsidies" and "employment subsidies" are used interchangeably.

Chapter 2

1 However, wage subsidies are not a recent phenomenon. The use of wage subsidies to reduce unemployment was advocated almost 50 years ago; see Kaldor (1936). The first known subsidy, undertaken for six months in Germany, dates from 1932 (Kopits, 1978).

2 For an inventory of major wage subsidy programs in Western Europe and North America, see United Nations (1984), OECD (1982), and Haveman and Christiansen (1978).

3 The level of unemployment that persists when all deficient-demand unemployment is removed (that is, the sum of frictional and structural unemployment). For estimates of the natural rate of unemployment in Canada, see Fortin and Newton (1982), and Fortin (1984 and 1986).

Chapter 3

1 Potential modifications were constrained by the fact that while regulation-based changes were possible, it was not possible (at that point in time) to effect revisions that required a legislative change in the *Employment Tax Credit Act*. Thus, while it was clear from the survey data that the largest marketing "payoff" would result from an increase in the tax credit incentive itself, it was decided to focus attention on those "deterrent" factors that required only a regulation-based change.

Chapter 4

1 Various arguments can be made to question this measure of the social cost of labour. For a complete discussion, see Gramlich (1981).

2 Boadway and Flatters (1981) use the term "shadow price of labour," which corresponds with the Jenkins and Kuo (1978) concept of the opportunity cost of a permanent job. Their term "opportunity cost of a job" corresponds to what Jenkins and Kuo refer to as the opportunity cost of a temporary job.

3 A nontechnically inclined reader could skip this part of the chapter without loss of any important information.

4 The assumption of minimum wage to generate unemployment in neoclassical models is fairly common (see, for example, Brecher, 1974; Harris and Todaro, 1970; and Jenkins and Kuo, 1978). Various other assumptions (e.g., presence of unions) could be used to obtain similar results. For a further discussion of this point, see Boadway and Flatters (1981).

5 The SOCJ to be used in the evaluation of programs, such as the ETCP, has generally been considered within the context of long-run equilibrium models that allow for interaction between regional labour markets. Recent important contributions in this area have been made by Harberger (1971*a*, 1971*b*, 1980); Jenkins and Kuo (1978); and Boadway and Flatters (1981). The model we develop here can be considered as a special case of the Harberger (1980) model: one region, two sectors with movement between the sectors.

6 This methodology for deriving the expression for welfare change is fairly standard. See, for example, Boadway and Flatters (1981) and references cited therein.

7 Insured workers constitute approximately 90 per cent of the total work force in Canada.

8 If an individual was employed (or unemployed) on January 1, 1975, the information on the employment (or unemployment) episode in our sample began as of the date that spell started.

9 The concept of unemployment used here is somewhat different from that of the Labour Force Survey (LFS) carried out by Statistics Canada. According to the LFS, a person is unemployed if he(she) is not working but looking for work during a reference week of a given month. This concept is rooted in job search activity, whereas our longitudinal measure of unemployment is tied to the unemployment insurance claim experience. A person is unemployed after a job during a given week if, after job separation, he(she) is serving a waiting period, or receiving full regular UI benefits, or serving a disqualification or a disentitlement period. In fact, the criterion of receiving regular benefits is the *most frequent* decision rule used in establishing whether or not a particular week is treated as unemployed for an

individual. A person, by interacting with the UI program, reveals his(her) unemployment status. Our concept of unemployment appears, on the surface, different from that of the LFS, but they are in fact conceptually related. A person who is receiving regular UI benefits is expected to search actively for a job. New entrants and some re-entrants, included in the LFS unemployment flow are, however, not included in the insured population and, therefore, excluded from the longitudinal file. They may be ineligible for UI benefits.

Our criterion for determining when a person is out of the labour force is much more restrictive than the one used by Statistics Canada for its LFS. For the LFDB, an individual is classified as being out of the labour force only if the person notified the unemployment insurance department that, for reasons such as sickness, schooling, maternity leave, or retirement, they were not available for work. Alternatively, if, in our examination of the person's labour force experience, we find that he(she) quit a job, did not find subsequent employment for an extended period, was eligible to collect UI benefits but did not make a claim, then we classified this individual as being out of the labour force. This criterion has also been used by some of the other users of the LFDB. See, for example, Glenday and Jenkins (1981*b*).

10 As there is a "cutoff" point of UI premiums above which the premium rate remains the same – a maximum of $265 per week in 1979 – data on wages below this maximum reflect actual wages, while those above understate the actual amount.

11 This is calculated according to the formula where uniform annual payments are to be paid at the end of each year per $1 borrowed now. For example, a debt of $1 can be repaid, at 10 per cent interest, with $1.10 in one year, or 57.8¢ annually for two years, or 40.3¢ annually for three years, or 13.2¢ annually for 15 years.

12 Even if we assume a uniform value of C for all the provinces, it does not make any significant difference to the calculations of the value of h.

13 In a *Wall Street Journal* article (July 30, 1982, p. 1), the following observation is made: "Non-union employees are seeing unionized industries hit hardest by the economic slump." From the same source, an article on U.S. wage negotiations with U.S. Steel notes that lower wages are being demanded by management or more layoffs will ensue: "Racked by the recession and unable to compete against lower-cost foreign producers, steelmakers are warning the union that unless it complies, there will be more lay-offs. Currently more than 100,000 steelworkers are out of work."

14 Notice that the values of leisure time, while unemployed, also include the value of hours spent in job search activity. The evidence suggests that the average unemployed individual spends only about 8.4 hours per week in search activity. See, for example, Gordon (1973), and Hasan and Gera (1982). For ETCP workers, the amount of time devoted to search activity is presumably very low. Those individuals who claim to have searched in the past four weeks and are thereby classified as unemployed may be distinguished from the subset classified as "not in the labour force" more by their desire to retain UI benefits than by a significantly different pattern of daily activity.

15 Although this estimate is comparable with some of the studies done elsewhere (Kopits, 1978), Clark and Freeman (1980) suggest that the time series studies of the determinants of employment have tended to find relatively low elasticities of response to wage changes. According to them, the low econometric estimates of elasticities of demand may result "from the particular type of model specified, with alternative models yielding different results; peculiar variation or lack of variation in the factor price variables, creating poor empirical 'experiments'; inadequate measurement of variables; correlation between the wage and error terms due to simultaneity; or, in fact, highly inelastic demand for labour." Their estimates suggest the wage elasticity of demand for production workers in manufacturing lies between –0.15 and –0.20 in the short run (one-quarter), and a value of –0.496 over the longer term (after two to three quarters).

16 In calculating f_1'' and subsequently using this estimate for the calculation of the social opportunity cost of an ETCP job, we make the following compromises. 1) The estimate of the long-run wage elasticity of employment or the elasticity of demand for labour in the permanent sector, ε, is obtained from the labour demand equation estimated for the private nonfarm sector of the Canadian economy. Strictly speaking, the estimate of ε should have been based on the data for the private nonfarm sector of the permanent sector. This would, however, not create any serious biases in our calculations unless the true estimate of ε is significantly different from –0.373 (or the estimate of ε is equal to or greater than –2). In a similar type of exercise, simulating the effects of a marginal employment tax credit on total employment, Hamermesh (1978) estimated the elasticity of demand for labour based on the data for the private nonfarm sector of the U.S. economy. 2) We further assume that the estimate of ε is the same across sectors and provinces.

17 The estimates for the social opportunity cost of an ETCP job could not be obtained for Prince Edward Island due to the nonavailability of some necessary data.

18 Program administration costs were calculated to average $54 per job over the two-year period covered by the study. When this cost (on a weekly or annual basis) is added to the calculated SOCJ, the resulting total cost is still lower than the market wage in all provinces.

Chapter 5

1 Due to methodological differences in the calculation of cost per net work-year created by the ETCP, these cost estimates

are slightly different than those reported by the Economic Council of Canada (1982) and Gera (1987).

Chapter 6

1 In the literature it is pointed out that job creation programs can generate long-run externalities. One source of positive externality may be an increase in social and economic stability, since individuals with good jobs are (supposedly) far less likely to commit crimes than are the chronically unemployed. Another source of positive externality due to the increased future employability of the program participants may be a reduction in UI payments. The reduction in payments alone is not a benefit since UI payments are transfer payments. However, if the cost of administering the UI system is reduced, this reduction is an economic benefit. Another category of increased social benefit could be called the "social psychological" benefits to the participants in the program. Haveman (1978) pointed out various subcategories of social psychological benefits – for example, any improvement in the well-being of participants that is not reflected in increased economic productivity. This can arise from a number of sources – the pleasure from contributing to an on-going productive process, the social interactions with other workers, etc.

2 The U.S. literature on the evaluation of manpower-training programs addresses the issue of how to select an appropriate control group. According to Kiefer (1976), the best method consists of choosing a sample of individuals from the target population and then randomly assigning them to serve as controls or trainees. This experimental procedure is not always feasible, of course (see, for example, Ashenfelter, 1974). One frequently used control group consists of "no-shows," individuals who were accepted into a training program but who did not show up, and early drop-outs. Both of these groups have an obvious defect: their members are different from members of the trainee group or else they would have shown up for training (or stayed in the program). The use of "no-shows" as a control group involves the implicit assumption that whether or not an individual shows up for training is uncorrelated with that individual's future earnings in the absence of training. This assumption seems unlikely to be true, though the direction of the bias introduced into the analysis is uncertain. An individual may not show up because he is offered a job, or because he is unreliable.

Another source of control comes from what is known as the "snowball" technique. Trainees are asked to name friends who were in the same situation in the labour market but who did not enter training. One of these individuals is then interviewed. If the trainee cannot name someone, or if the people named cannot be interviewed, then an interviewer canvasses the trainee's neighbourhood to find someone who was unemployed when the trainee was, but who did not enter a training program. This seems to be an effective way to construct a comparison group, although it is not as good as a random-assignment scheme. Another, still more expensive, technique is simply to canvass the trainee's neighbourhood without asking the trainee for a name. This will eliminate any bias resulting from the trainee's selection of a running mate.

3 This source of controls was not used in any of the studies surveyed in a recent survey of the manpower literature. See, for example, Perry et al. (1975); and Stromdorfer (1972).

4 The change in the probability-of-employment function was estimated by the ordinary-least-squares (OLS) technique. As suggested by Kiefer (1976), to estimate equation 6.1 the change in the probability of employment (ΔPE) around the conditional mean is represented by setting the observed ΔPE equal to the expected change in the probability of employment (ΔPE_e) plus an error, ξ. However, if $\Delta PE_e + \xi$ is greater than one, then ΔPE is equal to one representing the fact that a change in probability of employment greater than one is not observed. Similarly, if $\Delta PE + \xi$ is less than minus one, then ΔPE is equal to minus one, since the change in probability of employment cannot be less than minus one (i.e., representing a case of fully employed where probability of employment (PE) equals one, to fully unemployed, where PE equals zero). For details, see Kiefer (1976). It should be noted, however, that the OLS estimation may not cause much bias, because none of the individuals in our sample were fully employed or fully unemployed one year prior to, and after, the ETCP. We could not apply the maximum likelihood estimation technique, since the data were not handed over to us by Employment and Immigration Canada, in order to ensure compliance with confidentiality requirements. Note that there may exist some selectivity bias if, for example, employers "creamed off" the most productive workers from the pool of program participants and those individuals were still employed.

5 The results could be reflecting problems of self-selection, that is, persons who "stick to it," perhaps risk-averse individuals, stay in the ETCP longer and have longer tenure in jobs.

6 See Magun (1982). The author uses the LFDB file (as we do) to analyse the unemployment experience of the labour force over almost the same time period covered in this study. For information on the average duration of employment spells, see Glenday and Jenkins (1981*a*).

List of Tables and Charts

Tables

1-1	Direct Job Creation Programs, Number of Participants and Expenditures, Canada, 1977-85	2
2-1	Wage Subsidy Programs in Canada, 1977-85	6
2-2	Summary of Wage Subsidy Programs in Selected Industrialized Countries, 1970-83	9
2-3	Wage Subsidy Programs in Selected Industrialized Countries, by Target Group, 1970-83	9
2-4	Wage Subsidy Programs in Selected Industrialized Countries, by Duration of Subsidy, 1970-83	10
3-1	Number of Jobs Created under the ETCP, 1978-81	14
3-2	Distribution of Jobs Created under the ETCP, by Tax Credit Rate, 1978-81	15
3-3	Number of Jobs Created under the ETCP, by Province, 1978-81	15
3-4	Tax Credit Claimed under the ETCP, 1978-84	16
3-5	Tax Credit Claimed under the ETCP, by Corporation Size, Tax Years 1983 and 1984	16
3-6	Distribution of Participants Hired under the ETCP, by Size of Firm, 1978/79	17
3-7	Distribution of Employers Participating in the ETCP, by Number of Jobs Created, 1978/79	17
3-8	Distribution of Hirings under the ETCP, by Industry, 1978-81	17
3-9	Distribution of Jobs Created under the ETCP, by Occupation, 1978-81	18
3-10	Distribution of Participants in the ETCP, by Sex and Age, 1978/79	18
3-11	Employment Status of Participants Prior to Present ETCP Job, 1978/79	18
3-12	Main Source of Income of Participants Prior to Employment under the ETCP, 1978/79	18
4-1	Determinants of the Probability of Finding Alternative Employment for ETCP Participants, 1975 until the Program Joining Date	28
4-2	Mean Estimated Probability of Finding Alternative Employment for ETCP Workers, by Province, 1979	28
4-3	Determinants of the Proportion of Unemployment Time during which ETCP Participants Expect to Receive UI Benefits (d), 1975 until the Program Joining Date	29
4-4	Mean Estimated Proportion of Unemployed Time during which ETCP Workers Expect to Receive UI Benefits (d), by Province, 1979	29
4-5	Mean ETCP Weekly Wage, by Province ($\overline{W}_2$), 1979	30
4-6	Total Net Operating Costs per Apprentice Machinist over a Four-Year Period, Based on Instructor Wage Costs, Ontario	31
4-7	Estimated Cost Range of Training an Apprentice in Selected Trades over a Four-Year Period, British Columbia	31
4-8	Hourly Wage Rate and Weekly Wage for Machinists in the Nonunionized Skilled Sector, by Province, 1979	32
4-9	Weekly Value of Leisure Time (h) while Unemployed for ETCP Workers, by Province, 1979	32

4-10	Estimates of Other Variables, by Province, 1979	35
4-11	Weekly Social Opportunity Cost of Creating an ETCP Job, by Province, 1979	36
5-1	Displacement Effects of the ETCP, by Province, 1978-80	42
5-2	Responses to the ETCP Employer Survey, by Province, March 1979	43
5-3	Deadweight Impact of the ETCP, by Province, 1978 and 1979	44
5-4	Net Employment Effect of the ETCP, by Province, 1978-80	45
5-5	Net Employment Effect of Selected Subsidy Programs in Some Industrialized Countries	46
5-6	Cost per Net Work-Year Created by the ETCP, by Province, 1978-80	46
6-1	Demographic Characteristics of the ETCP Sample and the Control Group, 1975 to 1978/79	50
6-2	Labour Market Experience of the ETCP Sample and the Control Group, by Sex, 1975 to 1978/79	51
6-3	OLS Estimates of the Change in the Probability of Employment of the ETCP Participants, One Year before and One Year after the Program	52
6-4	OLS Estimates of the Total Number of Weeks of Employment per Spell, ETCP Participants, 1975-80	53
6-5	OLS Estimates of the Change in the Average Weekly Wage of the ETCP Participants, One Year before and One Year after the Program	54
6-6	Wage Distribution of the ETCP Sample and the Control Group, One Year before and One Year after the Program	55
A-1	Inventory of Major Employment Subsidy Programs in Selected Industrial Countries, 1970-83	63
B-1	The Characteristics of Movement in the Labour Force: Retirement and Entry	72
B-2	The Short-Run and Long-Run Implications of the Creation of 1,500 Jobs in the Temporary Sector	73
C-1	Guide to Variable Mnemonics	75
C-2	Calculation of Variables Used in Table 6-2	77

Charts

3-1	Number of Jobs Created under the ETCP, by Province, 1978-81	15
4-1	Social Opportunity Cost in Undistorted Situations	22
4-2	Social Opportunity Cost in the Presence of Distortions	23
4-3	Social Opportunity Cost of Unemployed Labour	24
4-4	Weekly Value of Leisure Time while Unemployed for ETCP Workers, by Province, 1979	33
4-5	Weekly Value of Leisure Time while Unemployed for ETCP Workers and Unemployment Rate, by Province, 1979	34
4-6	Weekly Social Opportunity Cost of Creating an ETCP Job, by Province, 1979	36
4-7	Social Opportunity Cost of an ETCP Job and Unemployment Rate, by Province, 1979	37
4-8	Net Benefit per ETCP Job per Week, by Province, 1979	38
4-9	Net Benefit (Wage Minus the SOCJ) per ETCP Job and Unemployment Rate, by Province, 1979	39
5-1	Net Number of Jobs Created by the ETCP, by Province, 1978-80	45
5-2	Budgetary Cost per Net Work-Year Created by the ETCP, by Province, 1978-80	47

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